BLM NS-RAQM STUDY

Comparison of CAMx Simulations Performed by BOEM and BLM

Final Project Report

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## Contents

1.0 BOEM 2012 BASE CASE AND BOEM 2020 FUTURE YEAR SIMULATIONS CONFIRMATIONS ................................................................. 1  
2.0 DIFFERENCES BETWEEN BOEM AND BLM SIMULATIONS ................................................ 3  
3.0 CONFIRMATION METHODOLOGY ....................................................................................... 4  
4.0 CAMX 6.20 BASE COMPARISON ....................................................................................... 5  
  4.1 Ozone .......................................................................................................................... 5  
  4.2 PM$_{2.5}$ .................................................................................................................... 27  
  4.3 Sulfate ....................................................................................................................... 49  
  4.4 Nitrate ....................................................................................................................... 71  
  4.5 Organic Carbon (OC) ............................................................................................... 93  
5.0 CAMX 6.20 FY2020 COMPARISON ................................................................................ 115  
  5.1 Ozone ....................................................................................................................... 115  
  5.2 PM$_{2.5}$ .................................................................................................................... 137  
  5.3 Sulfate ....................................................................................................................... 159  
  5.4 Nitrate ....................................................................................................................... 181  
  5.5 Organic Carbon (OC) ............................................................................................... 203  
6.0 CONCLUSION .................................................................................................................. 225
TABLES

Table 4-1. Comparison of base CAMx 6.20 Simulation Ozone Concentrations (ppb) Run on BLM and BOEM Computer Systems. Hours with the Top 10 Maximum Positive and Maximum Negative Differences are Shown.................................................................6

Table 4-2. Comparison of base CAMx 6.20 Simulation PM$_{2.5}$ Concentrations (µg/m$^3$) Run on BLM and BOEM Computer Systems. Hours with the Top 10 Maximum Positive and Maximum Negative Differences are Shown..........................................................28

Table 4-3. Comparison of base CAMx 6.20 Simulation Sulfate Concentrations (µg/m$^3$) Run on BLM and BOEM Computer Systems. Hours with the Top 10 Maximum Positive and Maximum Negative Differences are Shown.......................................................50

Table 4-4. Comparison of base CAMx 6.20 Simulation Nitrate Concentrations (µg/m$^3$) Run on BLM and BOEM Computer Systems. Hours with the Top 10 Maximum Positive and Maximum Negative Differences are Shown.....................................................72

Table 4-5. Comparison of base CAMx 6.20 Simulation Organic Carbon Concentrations (µg/m$^3$) Run on BLM and BOEM Computer Systems. Hours with the Top 10 Maximum Positive and Maximum Negative Differences are Shown......................................................94

Table 5-1. Comparison of fy2020 CAMx 6.20 Simulation Ozone Concentrations (ppb) Run on BLM and BOEM Computer Systems. Hours with the Top 10 Maximum Positive and Maximum Negative Differences are Shown....................................................116

Table 5-2. Comparison of fy2020 CAMx 6.20 Simulation PM$_{2.5}$ Concentrations (µg/m$^3$) Run on BLM and BOEM Computer Systems. Hours with the Top 10 Maximum Positive and Maximum Negative Differences are Shown..................................................138

Table 5-3. Comparison of fy2020 CAMx 6.20 Simulation Sulfate Concentrations (µg/m$^3$) Run on BLM and BOEM Computer Systems. Hours with the Top 10 Maximum Positive and Maximum Negative Differences are Shown...............................................160

Table 5-4. Comparison of fy2020 CAMx 6.20 Simulation Nitrate Concentrations (µg/m$^3$) Run on BLM and BOEM Computer Systems. Hours with the Top 10 Maximum Positive and Maximum Negative Differences are Shown...............................................182

Table 5-5. Comparison of fy2020 CAMx 6.20 Simulation Organic Carbon Concentrations (µg/m$^3$) Run on BLM and BOEM Computer Systems. Hours with the Top 10 Maximum Positive and Maximum Negative Differences are Shown..............................................204
FIGURES

Figure 4-1: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Maximum Positive Difference) ..............................................................7

Figure 4-2: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Second Highest Positive Difference) .....................................................8

Figure 4-3: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Third Highest Positive Difference) .......................................................9

Figure 4-4: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Fourth Highest Positive Difference) .....................................................10

Figure 4-5: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Fifth Highest Positive Difference) .......................................................11

Figure 4-6: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Sixth Highest Positive Difference) ....................................................12

Figure 4-7: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Seventh Highest Positive Difference) .................................................13

Figure 4-8: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Eighth Highest Positive Difference) ...................................................14

Figure 4-9: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Ninth Highest Positive Difference) ......................................................15

Figure 4-10: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Tenth Highest Positive Difference) ....................................................16

Figure 4-11: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Maximum Negative Difference) ....................................................17

Figure 4-12: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Second Highest Negative Difference) ..............................................18

Figure 4-13: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Third Highest Negative Difference) ...................................................19

Figure 4-14: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Fourth Highest Negative Difference) .............................................20

Figure 4-15: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Fifth Highest Negative Difference) ...............................................21

Figure 4-16: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Sixth Highest Negative Difference) ..............................................22

Figure 4-17: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Seventh Highest Negative Difference) .............................................23

Figure 4-18: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Eighth Highest Negative Difference) ..............................................24

Figure 4-19: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Ninth Highest Negative Difference) ..............................................25
Figure 4-20: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Tenth Highest Negative Difference) .................................................................26

Figure 4-21: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Maximum Positive Difference) ..................................................................29

Figure 4-22: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Second Highest Positive Difference) ..................................................30

Figure 4-23: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Third Highest Positive Difference) .................................................31

Figure 4-24: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Fourth Highest Positive Difference) ..............................................32

Figure 4-25: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Fifth Highest Positive Difference) ..................................................33

Figure 4-26: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Sixth Highest Positive Difference) .................................................34

Figure 4-27: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Seventh Highest Positive Difference) ..........................................35

Figure 4-28: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Eighth Highest Positive Difference) .................................................36

Figure 4-29: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Ninth Highest Positive Difference) .................................................37

Figure 4-30: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Tenth Highest Positive Difference) .................................................38

Figure 4-31: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Maximum Negative Difference) ....................................................39

Figure 4-32: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Second Highest Negative Difference) ...........................................40

Figure 4-33: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Third Highest Negative Difference) ..............................................41

Figure 4-34: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Fourth Highest Negative Difference) ..........................................42

Figure 4-35: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Fifth Highest Negative Difference) .................................................43

Figure 4-36: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Sixth Highest Negative Difference) .................................................44

Figure 4-37: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Seventh Highest Negative Difference) ...........................................45

Figure 4-38: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Eighth Highest Negative Difference) ................................ ..........46

Figure 4-39: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Ninth Highest Negative Difference) .............................................47
Figure 4-40: Comparison of PM$_{2.5}$ Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 base Simulations (Tenth Highest Negative Difference) ..........................................................48

Figure 4-41: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 base Simulations (Maximum Positive Difference) .........................................................51

Figure 4-42: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 base Simulations (Second Highest Positive Difference) ...........................................52

Figure 4-43: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 base Simulations (Third Highest Positive Difference) ............................................53

Figure 4-44: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 base Simulations (Fourth Highest Positive Difference) ............................................54

Figure 4-45: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 base Simulations (Fifth Highest Positive Difference) .............................................55

Figure 4-46: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 base Simulations (Sixth Highest Positive Difference) .........................................56

Figure 4-47: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 base Simulations (Seventh Highest Positive Difference) ....................................57

Figure 4-48: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 base Simulations (Eighth Highest Positive Difference) .......................................58

Figure 4-49: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 base Simulations (Ninth Highest Positive Difference) .........................................59

Figure 4-50: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 base Simulations (Tenth Highest Positive Difference) ...........................................60

Figure 4-51: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 base Simulations (Maximum Negative Difference) ..............................................61

Figure 4-52: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 base Simulations (Second Highest Negative Difference) .....................................62

Figure 4-53: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 base Simulations (Third Highest Negative Difference) .......................................63

Figure 4-54: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 base Simulations (Fourth Highest Negative Difference) ......................................64

Figure 4-55: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 base Simulations (Fifth Highest Negative Difference) .........................................65

Figure 4-56: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 base Simulations (Sixth Highest Negative Difference) ........................................66

Figure 4-57: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 base Simulations (Seventh Highest Negative Difference) .....................................67

Figure 4-58: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 base Simulations (Eighth Highest Negative Difference) .......................................68

Figure 4-59: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 base Simulations (Ninth Highest Negative Difference) ........................................69
Figure 4-60: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx
6.20 base Simulations (Tenth Highest Negative Difference) ............................................70

Figure 4-61: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx
6.20 base Simulations (Maximum Positive Difference) ....................................................73

Figure 4-62: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx
6.20 base Simulations (Second Highest Positive Difference) ...........................................74

Figure 4-63: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx
6.20 base Simulations (Third Highest Positive Difference) ..............................................75

Figure 4-64: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx
6.20 base Simulations (Fourth Highest Positive Difference) ............................................76

Figure 4-65: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx
6.20 base Simulations (Fifth Highest Positive Difference) ...............................................77

Figure 4-66: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx
6.20 base Simulations (Sixth Highest Positive Difference) ...............................................78

Figure 4-67: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx
6.20 base Simulations (Seventh Highest Positive Difference) ...........................................79

Figure 4-68: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx
6.20 base Simulations (Eighth Highest Positive Difference) .............................................80

Figure 4-69: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx
6.20 base Simulations (Ninth Highest Positive Difference) ..............................................81

Figure 4-70: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx
6.20 base Simulations (Tenth Highest Positive Difference) .............................................82

Figure 4-71: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx
6.20 base Simulations (Maximum Negative Difference) ..................................................83

Figure 4-72: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx
6.20 base Simulations (Second Highest Negative Difference) ...........................................84

Figure 4-73: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx
6.20 base Simulations (Third Highest Negative Difference) ..............................................85

Figure 4-74: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx
6.20 base Simulations (Fourth Highest Negative Difference) ............................................86

Figure 4-75: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx
6.20 base Simulations (Fifth Highest Negative Difference) ...............................................87

Figure 4-76: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx
6.20 base Simulations (Sixth Highest Negative Difference) ...............................................88

Figure 4-77: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx
6.20 base Simulations (Seventh Highest Negative Difference) .........................................89

Figure 4-78: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx
6.20 base Simulations (Eighth Highest Negative Difference) ...........................................90

Figure 4-79: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx
6.20 base Simulations (Ninth Highest Negative Difference) .............................................91
Figure 4-80: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Tenth Highest Negative Difference) ............................................92
Figure 4-81: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Maximum Positive Difference) ............................................95
Figure 4-82: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Second Highest Positive Difference) ............................................96
Figure 4-83: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Third Highest Positive Difference) ............................................97
Figure 4-84: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Fourth Highest Positive Difference) ............................................98
Figure 4-85: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Fifth Highest Positive Difference) ............................................99
Figure 4-86: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Sixth Highest Positive Difference) ............................................100
Figure 4-87: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Seventh Highest Positive Difference) ............................................101
Figure 4-88: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Eighth Highest Positive Difference) ............................................102
Figure 4-89: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Ninth Highest Positive Difference) ............................................103
Figure 4-90: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Tenth Highest Positive Difference) ............................................104
Figure 4-91: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Maximum Negative Difference) ............................................105
Figure 4-92: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Second Highest Negative Difference) ............................................106
Figure 4-93: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Third Highest Negative Difference) ............................................107
Figure 4-94: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Fourth Highest Negative Difference) ............................................108
Figure 4-95: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Fifth Highest Negative Difference) ............................................109
Figure 4-96: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Sixth Highest Negative Difference) ............................................110
Figure 4-97: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Seventh Highest Negative Difference) ............................................111
Figure 4-98: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Eighth Highest Negative Difference) ............................................112
Figure 4-99: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Ninth Highest Negative Difference) ............................................113
Figure 4-100: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Tenth Highest Negative Difference) ........................................114

Figure 5-1: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Maximum Positive Difference) ..................................................117

Figure 5-2: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Second Highest Positive Difference) ........................................118

Figure 5-3: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Third Highest Positive Difference) .......................................119

Figure 5-4: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fourth Highest Positive Difference) ......................................120

Figure 5-4: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fourth Highest Positive Difference) ......................................121

Figure 5-6: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Sixth Highest Positive Difference) .........................................122

Figure 5-7: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Seventh Highest Positive Difference) ....................................123

Figure 5-8: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Eighth Highest Positive Difference) .......................................124

Figure 5-9: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Ninth Highest Positive Difference) ........................................125

Figure 5-10: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Tenth Highest Positive Difference) .......................................126

Figure 5-11: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Maximum Negative Difference) .........................................127

Figure 5-12: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Second Highest Negative Difference) ...............................128

Figure 5-13: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Third Highest Negative Difference) ....................................129

Figure 5-14: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fourth Highest Negative Difference) ...............................130

Figure 5-15: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fifth Highest Negative Difference) ......................................131

Figure 5-16: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Sixth Highest Negative Difference) .....................................132

Figure 5-17: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Seventh Highest Negative Difference) ...............................133

Figure 5-18: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Eighth Highest Negative Difference) ...............................134

Figure 5-19: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Ninth Highest Negative Difference) ...............................135
Figure 5-20: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Tenth Highest Negative Difference) ..............................................136

Figure 5-21: Comparison of PM$_{2.5}$ Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Maximum Positive Difference) ......................................................139

Figure 5-22: Comparison of PM$_{2.5}$ Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Second Highest Positive Difference) .............................................140

Figure 5-23: Comparison of PM$_{2.5}$ Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Third Highest Positive Difference) .............................................141

Figure 5-24: Comparison of PM$_{2.5}$ Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fourth Highest Positive Difference) .............................................142

Figure 5-25: Comparison of PM$_{2.5}$ Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fifth Highest Positive Difference) ...........................................143

Figure 5-26: Comparison of PM$_{2.5}$ Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Sixth Highest Positive Difference) ..........................................144

Figure 5-27: Comparison of PM$_{2.5}$ Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Seventh Highest Positive Difference) ...........................................145

Figure 5-28: Comparison of PM$_{2.5}$ Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Eighth Highest Positive Difference) .............................................146

Figure 5-29: Comparison of PM$_{2.5}$ Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Ninth Highest Positive Difference) ...........................................147

Figure 5-30: Comparison of PM$_{2.5}$ Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Tenth Highest Positive Difference) ............................................148

Figure 5-31: Comparison of PM$_{2.5}$ Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Maximum Negative Difference) ...................................................149

Figure 5-32: Comparison of PM$_{2.5}$ Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Second Highest Negative Difference) ..........................................150

Figure 5-33: Comparison of PM$_{2.5}$ Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Third Highest Negative Difference) ............................................151

Figure 5-34: Comparison of PM$_{2.5}$ Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fourth Highest Negative Difference) ..........................................152

Figure 5-35: Comparison of PM$_{2.5}$ Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fifth Highest Negative Difference) ...........................................153

Figure 5-36: Comparison of PM$_{2.5}$ Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Sixth Highest Negative Difference) .........................................154

Figure 5-37: Comparison of PM$_{2.5}$ Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Seventh Highest Negative Difference) ...........................................155

Figure 5-38: Comparison of PM$_{2.5}$ Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Eighth Highest Negative Difference) ..........................................156

Figure 5-39: Comparison of PM$_{2.5}$ Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Ninth Highest Negative Difference) ...........................................157
Figure 5-40: Comparison of PM$_{2.5}$ Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Tenth Highest Negative Difference) .................................................................158

Figure 5-41: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Maximum Positive Difference) .........................................................161

Figure 5-42: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Second Highest Positive Difference) ...........................................162

Figure 5-43: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Third Highest Positive Difference) ...........................................163

Figure 5-44: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fourth Highest Positive Difference) ......................................164

Figure 5-45: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fifth Highest Positive Difference) ........................................165

Figure 5-46: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Sixth Highest Positive Difference) .......................................166

Figure 5-47: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Seventh Highest Positive Difference) ....................................167

Figure 5-48: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Eighth Highest Positive Difference) ......................................168

Figure 5-49: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Ninth Highest Positive Difference) ......................................169

Figure 5-50: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Tenth Highest Positive Difference) ........................................170

Figure 5-51: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Maximum Negative Difference) ........................................171

Figure 5-52: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Second Highest Negative Difference) .....................................172

Figure 5-53: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Third Highest Negative Difference) .....................................173

Figure 5-54: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fourth Highest Negative Difference) ..............................174

Figure 5-55: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fifth Highest Negative Difference) ...............................175

Figure 5-56: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Sixth Highest Negative Difference) ...............................176

Figure 5-57: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Seventh Highest Negative Difference) ............................177

Figure 5-58: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Eight Highest Negative Difference) ...............................178

Figure 5-59: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Ninth Highest Negative Difference) ..............................179
Figure 5-60: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Tenth Highest Negative Difference) ..................................................180

Figure 5-61: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Maximum Positive Difference) ..................................................183

Figure 5-62: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Second Highest Positive Difference) .....................................184

Figure 5-63: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Third Highest Positive Difference) .....................................185

Figure 5-64: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fourth Highest Positive Difference) .....................................186

Figure 5-65: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fifth Highest Positive Difference) .....................................187

Figure 5-66: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Sixth Highest Positive Difference) .....................................188

Figure 5-67: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Seventh Highest Positive Difference) .................................189

Figure 5-68: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Eighth Highest Positive Difference) ...................................190

Figure 5-69: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Ninth Highest Positive Difference) ...................................191

Figure 5-70: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Tenth Highest Positive Difference) ...................................192

Figure 5-71: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Maximum Negative Difference) ........................................193

Figure 5-72: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Second Highest Negative Difference) ................................194

Figure 5-73: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Third Highest Negative Difference) ................................195

Figure 5-74: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fourth Highest Negative Difference) ................................196

Figure 5-75: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fifth Highest Negative Difference) ................................197

Figure 5-76: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Sixth Highest Negative Difference) ................................198

Figure 5-77: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Seventh Highest Negative Difference) ............................199

Figure 5-78: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Eighth Highest Negative Difference) ............................200

Figure 5-79: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Ninth Highest Negative Difference) ............................201
Figure 5-80: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Tenth Highest Negative Difference) ..........................................................202

Figure 5-81: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Maximum Positive Difference) ..................................................205

Figure 5-82: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Second Highest Positive Difference) ..........................206

Figure 5-83: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Third Highest Positive Difference) ..........................207

Figure 5-84: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fourth Highest Positive Difference) ..........................208

Figure 5-85: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fifth Highest Positive Difference) ..............................209

Figure 5-86: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Sixth Highest Positive Difference) .............................210

Figure 5-87: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Seventh Highest Positive Difference) ..........................211

Figure 5-88: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Eighth Highest Positive Difference) ............................212

Figure 5-89: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Ninth Highest Positive Difference) .............................213

Figure 5-90: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Tenth Highest Positive Difference) ............................214

Figure 5-91: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Maximum Negative Difference) ..............................215

Figure 5-92: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Second Highest Negative Difference) .........................216

Figure 5-93: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Third Highest Negative Difference) .........................217

Figure 5-94: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fourth Highest Negative Difference) .........................218

Figure 5-95: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fifth Highest Negative Difference) .........................219

Figure 5-96: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Sixth Highest Negative Difference) .........................220

Figure 5-97: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Seventh Highest Negative Difference) .........................221

Figure 5-98: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations ( Eighth Highest Negative Difference) .........................222

Figure 5-99: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Ninth Highest Negative Difference) .........................223
Figure 5-100: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Tenth Highest Negative Difference)..........................224
1.0 BOEM 2012 BASE CASE AND BOEM 2020 FUTURE YEAR SIMULATIONS CONFIRMATIONS

Alpine Geophysics (Alpine) has executed two confirmation PGM runs, one for the BOEM base case (2012) and one for the BOEM future year (2020), to confirm the BLM NS-RAQM team’s ability to replicate BOEM’s results and to ensure that the BOEM data, models, and scripts operated consistent with BOEM’s procedure.

Two simulations executed on the Alpine computer system are compared with two simulations provided by BOEM with the modeling platform. The comparisons separately examined the differences in results between the base case modeling executed on the Alpine and BOEM computers, and between the future year modeling executed on the Alpine and BOEM computers. The base case and future case simulations differed only in the emissions inventory used in the modeling. The base case simulations used 2012 emissions, and the future case simulations used emissions forecast to 2020.

The data for this analysis are paired in space and time, meaning that each plot represents a comparison of the two simulations at the same monitor on the same day. Although there is some variability between the two runs, the runs are not expected to be exactly the same due to numerical differences that arise from the different computing architectures used for the BOEM and BLM (Alpine) simulations. The numerics in photochemical grid models are very complex and it is typical to get slightly different model concentrations based on the version of the computer and compilers. When comparing simulations, it is critical to isolate the changes in concentrations to the changes in the model inputs, and not on the computing details (i.e., compiler version, computer architecture, parallelization options). This is especially problematic when looking at particulate matter, since the particulate treatments have multiple pathways, and small concentration differences can lead to different pathways through the code and different concentrations.

Sources of the difference can come from the options used in CAMx compilation, the version of the compiler, the compiler vendor, and how the model calculation is split onto different processors (parallelization). This document presents a detailed comparison of the simulations performed on the BOEM and Alpine computer system and may inform BLM on potential expected differences if other groups are doing PGM using the CAMx model.
2.0 DIFFERENCES BETWEEN BOEM AND BLM SIMULATIONS

Alpine configured and ran the CAMx model as similarly as possible to the BOEM’s modelling. Both groups configured the modelling with 10 Message Passing Interface (MPI) instances, each with two OpenMP threads. Also, both groups used the Portland Group FORTRAN compiler with MPI running over MPICH3 on Linux clusters.

The simulations likely differed in the version of the Portland Group compiler and the release of the Linux operating system.
3.0 CONFIRMATION METHODOLOGY

The comparison of simulations on the Alpine computer cluster and the BOEM computer are based on hourly differences in ozone, particulate matter less than 2.5 microns in aerodynamic diameter (PM$_{2.5}$), organic carbon (OC), particulate nitrate, and particulate sulfate. The metrics for comparison are the absolute difference (Equation 1) and percent difference (Equation 2) defined as:

(Equation 1) \[
(C_{blm} - C_{boem})
\]

(Equation 2) \[
\frac{(C_{blm} - C_{boem})}{(C_{blm})}
\]

where: $C_{boem}$ is the concentration at each grid cell hour for the BOEM simulation and $C_{blm}$ is the concentration at each grid cell hour for the BLM simulation.

The results are presented for the hours with the largest difference between the BOEM and BLM simulations. A table presents the hours with the top 10 positive and negative absolute differences. Spatial maps are presented for the hours with the top 10 highest positive and negative differences. To provide context for the differences, concentration maps/plots also are presented for each of the hours of high difference. On each spatial plot the maximum positive and negative values, along with the grid cell in which these occur, are presented at the top of the graphic. The coordinates refer to the row number and column number of the cell referenced to the cell coordinates on the bottom (column) and left (row) of the graphic.

Hourly animations of these results also have been prepared and will be delivered to BLM as part of the project deliverables.
4.0 CAMX 6.20 BASE COMPARISON

This section presents comparisons of the base case simulations using CAMx 6.20 performed on the Alpine and BOEM computer systems.

4.1 Ozone

Ozone results for the hours resulting in the 10 highest positive and negative concentration differences are presented in Table 4-1. The differences are very small. The maximum positive difference is 0.006 ppb, falling to 0.003 ppb for the 10th high. The maximum negative difference is -0.011 ppb, falling to -0.006 ppb for the 10th high. The highest differences occur during hours with ozone concentrations ranging from 29 ppb to 42 ppb for the BOEM simulation. The maximum positive and negative percent differences are less than |0.0%|.

The top ten positive concentration difference hours are presented in Figures 4-1 through 4-10, and the top ten negative impact hours are presented in Figures 4-11 through 4-20. No grid cells have concentration differences (rounded to two decimal places) over the |0.01| ppb plotting threshold, so no locations appear on the difference plots.
Table 4-1. Comparison of base CAMx 6.20 Simulation Ozone Concentrations (ppb) Run on BLM and BOEM Computer Systems. Hours with the Top 10 Maximum Positive and Maximum Negative Differences are Shown.

<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
<th>Day</th>
<th>Hour</th>
<th>BLM Conc.</th>
<th>BOEM Conc.</th>
<th>Difference (ppb)</th>
<th>Percent Difference</th>
<th>Column</th>
<th>Row</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maximum Positive</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>7</td>
<td>12</td>
<td>20</td>
<td>36.907</td>
<td>36.901</td>
<td>0.006</td>
<td>0.0%</td>
<td>210</td>
<td>54</td>
</tr>
<tr>
<td>2012</td>
<td>7</td>
<td>12</td>
<td>19</td>
<td>39.688</td>
<td>39.683</td>
<td>0.005</td>
<td>0.0%</td>
<td>214</td>
<td>55</td>
</tr>
<tr>
<td>2012</td>
<td>7</td>
<td>12</td>
<td>21</td>
<td>31.967</td>
<td>31.963</td>
<td>0.005</td>
<td>0.0%</td>
<td>206</td>
<td>52</td>
</tr>
<tr>
<td>2012</td>
<td>7</td>
<td>12</td>
<td>22</td>
<td>29.195</td>
<td>29.191</td>
<td>0.004</td>
<td>0.0%</td>
<td>203</td>
<td>50</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>15</td>
<td>16</td>
<td>31.278</td>
<td>31.274</td>
<td>0.004</td>
<td>0.0%</td>
<td>269</td>
<td>57</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>15</td>
<td>15</td>
<td>31.564</td>
<td>31.561</td>
<td>0.004</td>
<td>0.0%</td>
<td>267</td>
<td>59</td>
</tr>
<tr>
<td>2012</td>
<td>7</td>
<td>12</td>
<td>23</td>
<td>28.100</td>
<td>28.097</td>
<td>0.003</td>
<td>0.0%</td>
<td>200</td>
<td>48</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>15</td>
<td>18</td>
<td>37.488</td>
<td>37.485</td>
<td>0.003</td>
<td>0.0%</td>
<td>194</td>
<td>57</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>15</td>
<td>17</td>
<td>37.913</td>
<td>37.910</td>
<td>0.003</td>
<td>0.0%</td>
<td>227</td>
<td>60</td>
</tr>
<tr>
<td>2012</td>
<td>7</td>
<td>12</td>
<td>17</td>
<td>42.183</td>
<td>42.180</td>
<td>0.003</td>
<td>0.0%</td>
<td>224</td>
<td>58</td>
</tr>
<tr>
<td><strong>Maximum Negative</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>10</td>
<td>14</td>
<td>15</td>
<td>38.932</td>
<td>38.943</td>
<td>-0.011</td>
<td>-0.0%</td>
<td>252</td>
<td>139</td>
</tr>
<tr>
<td>2012</td>
<td>10</td>
<td>14</td>
<td>16</td>
<td>39.848</td>
<td>39.858</td>
<td>-0.010</td>
<td>-0.0%</td>
<td>243</td>
<td>139</td>
</tr>
<tr>
<td>2012</td>
<td>10</td>
<td>14</td>
<td>17</td>
<td>40.221</td>
<td>40.230</td>
<td>-0.008</td>
<td>-0.0%</td>
<td>234</td>
<td>139</td>
</tr>
<tr>
<td>2012</td>
<td>10</td>
<td>14</td>
<td>18</td>
<td>40.540</td>
<td>40.548</td>
<td>-0.008</td>
<td>-0.0%</td>
<td>226</td>
<td>135</td>
</tr>
<tr>
<td>2012</td>
<td>10</td>
<td>14</td>
<td>19</td>
<td>40.513</td>
<td>40.521</td>
<td>-0.008</td>
<td>-0.0%</td>
<td>220</td>
<td>139</td>
</tr>
<tr>
<td>2012</td>
<td>10</td>
<td>16</td>
<td>3</td>
<td>38.168</td>
<td>38.175</td>
<td>-0.007</td>
<td>-0.0%</td>
<td>153</td>
<td>139</td>
</tr>
<tr>
<td>2012</td>
<td>10</td>
<td>16</td>
<td>4</td>
<td>37.934</td>
<td>37.941</td>
<td>-0.007</td>
<td>-0.0%</td>
<td>154</td>
<td>134</td>
</tr>
<tr>
<td>2012</td>
<td>10</td>
<td>16</td>
<td>5</td>
<td>38.081</td>
<td>38.087</td>
<td>-0.007</td>
<td>-0.0%</td>
<td>155</td>
<td>126</td>
</tr>
<tr>
<td>2012</td>
<td>10</td>
<td>16</td>
<td>6</td>
<td>37.884</td>
<td>37.891</td>
<td>-0.006</td>
<td>-0.0%</td>
<td>155</td>
<td>116</td>
</tr>
<tr>
<td>2012</td>
<td>10</td>
<td>16</td>
<td>7</td>
<td>37.868</td>
<td>37.875</td>
<td>-0.006</td>
<td>-0.0%</td>
<td>154</td>
<td>104</td>
</tr>
</tbody>
</table>
Figure 4-1: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Maximum Positive Difference)
Second Highest Positive Difference: July 12 at 1900 hours

**BLM Simulation**

Max value: 4.307E+01 at (38. 63)
Min value: 7.934E+00 at (63.101) non zero cells only
Avg value: 2.660E+01 non zero cells only
Grid Total: 9.932E+05

**Difference (BLM-BOEM)**

Max value: 5.397E-03 at (61.45)
Min value: -1.793E-03 at (50.53) non zero cells only
Avg value: 9.492E-06 non zero cells only
Grid Total: 2.965E-01

---

**Figure 4-2: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Second Highest Positive Difference)**
Third Highest Positive Difference: July 12 at 2100 hours

BLM Simulation

Figure 4-3: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Third Highest Positive Difference)
Figure 4-4: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Fourth Highest Positive Difference)
Figure 4-5: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Fifth Highest Positive Difference)
Sixth Highest Positive Difference: June 15 at 1500 hours

BLM Simulation

**Figure 4-6: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Sixth Highest Positive Difference)**
Seventh Highest Positive Difference: July 12 at 2300 hours

BLM Simulation

Figure 4-7: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Seventh Highest Positive Difference)
Figure 4-8: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Eighth Highest Positive Difference)
Ninth Highest Positive Difference: June 15 at 1700 hours

BLM Simulation

Figure 4-9: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Ninth Highest Positive Difference)
Tenth Highest Positive Difference: July 12 at 1700 hours

BLM Simulation

Max value: 4.48E+01 at (45, 64)
Min value: 9.03E+00 at (60,101) non zero cells only
Avg value: 2.60E+01 non zero cells only
Grid Total: 1.013E+00

Figure 4-10: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Tenth Highest Positive Difference)

Difference (BLM-BOEM)

Max value: 2.94E-03 at (624, 56)
Min value: -2.33E-03 at (531, 60) non zero cells only
Avg value: 1.14E-03 non zero cells only
Grid Total: 3.56E-02

Figure 4-10: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Tenth Highest Positive Difference)
Maximum Negative Difference: October 14 at 1500 hours

BLM Simulation

Max value: 4.428E+01 at (234, 47)
Min value: 2.495E+01 at (259, 68) non zero cells only
Avg value: 3.517E+01 non zero cells only
Grid Total: 1.339E+06

![BLM Simulation Map](image)

Difference (BLM-BOEM)

Max value: 4.735E-04 at (285, 3)
Min value: -1.099E-02 at (256,139) non zero cells only
Avg value: -3.492E-04 non zero cells only
Grid Total: -6.997E+00

![Difference Map](image)

Figure 4-11: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Maximum Negative Difference)
Second Highest Negative Difference: October 14 at 1600 hours

BLM Simulation

Difference (BLM-BOEM)

Figure 4-12: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Second Highest Negative Difference)
Third Highest Negative Difference: October 14 at 1700 hours

BLM Simulation

Max value: 4.316E+01 at (334, 47)
Min value: 2.477E+01 at (156, 56) non zero cells only
Avg value: 3.494E+01 non zero cells only
Grid Total: 1.331E+06

Figure 4-13: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Third Highest Negative Difference)
Fourth Highest Negative Difference: October 14 at 1800 hours

BLM Simulation

Max value: 4.319E+9 at (228,109)
Min value: 2.442E+01 at (156, 60) non zero cells only
Avg value: 3.489E+01 non zero cells only
Grid Total: 1.360E+06

Figure 4-14: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Fourth Highest Negative Difference)
Fifth Highest Negative Difference: October 14 at 1900 hours

BLM Simulation

Figure 4-15: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Fifth Highest Negative Difference)
Sixth Highest Negative Difference: October 16 at 300 hours

BLM Simulation

Max value: 4.172E+01 at (148, 92)
Min value: 1.974E+01 at (209, 76) non zero cells only
Avg value: 3.422E+01 non zero cells only
Grid Total: 1.304E+06

Figure 4-16: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Sixth Highest Negative Difference)
Seventh Highest Negative Difference: October 16 at 400 hours

BLM Simulation

Figure 4-17: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Seventh Highest Negative Difference)
Eighth Highest Negative Difference: October 16 at 500 hours

BLM Simulation

Max value: 4.1099E+01 at (151, 86)
Min value: 2.9928E+01 at (309, 70) non zero cells only
Avg value: 3.4348E+01 non zero cells only
Grid Total: 1.308E+06

Figure 4-18: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Eighth Highest Negative Difference)
Figure 4-19: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Ninth Highest Negative Difference)
Figure 4-20: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 base Simulations (Tenth Highest Negative Difference)
4.2 \textbf{PM}_2.5

\textbf{PM}_2.5 \textit{results for the hours resulting in the 10 highest positive and negative concentration differences are presented in Table 4-2.} The maximum positive difference is 0.722 µg/m³, falling to 0.432 µg/m³ for the 10th high. The maximum negative difference is -0.785 µg/m³, falling to -0.477 µg/m³ for the 10th high. The maximum positive and negative percent differences are 33.4\% and -49.2\%, respectively, both on low \textbf{PM}_2.5 concentration days.

The top 10 positive concentration difference hours are presented in Figures 4-21 through 4-30, and the top 10 negative concentration difference hours are presented in Figures 4-31 through 4-40. The locations of the impacts are scattered over the elevated terrain in the Brooks Range or in offshore regions, with a mix of positive and negative differences in the same region. Many of 10 highest and lowest concentration difference hours occur on the same days. The total summed concentrations of \textbf{PM}_2.5 across the entire 4km grid domain for both simulations are nearly identical. The sum of the gridded concentrations for the hour with the highest positive difference is 41,160 µg/m³, and the sum of the concentration differences for this hour is only 8.523 µg/m³. The sum of the gridded concentrations for the hour with the highest negative difference is 42,140 µg/m³, and the sum of the concentration differences for this hour is 3.912 µg/m³. Vanishingly small differences meaning that the positive differences are very nearly equal to the negative differences.

Comparison with the nitrate results in Section 4.4 shows that 19 of the 20 maximum positive and negative difference hours are the same for the nitrate and \textbf{PM}_2.5, indicating that the principal difference in the \textbf{PM}_2.5 concentrations is a result of the differences in the nitrate predictions. We speculate that the differences are most likely from different pathways being taken in the ISORROPIA algorithm.
Table 4-2. Comparison of base CAMx 6.20 Simulation PM$_{2.5}$ Concentrations (µg/m$^3$) Run on BLM and BOEM Computer Systems. Hours with the Top 10 Maximum Positive and Maximum Negative Differences are Shown.

<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
<th>Day</th>
<th>Hour</th>
<th>BLM Conc.</th>
<th>BOEM Conc.</th>
<th>Difference (µg/m$^3$)</th>
<th>Percent Difference</th>
<th>Column</th>
<th>Row</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>2.164</td>
<td>1.441</td>
<td>0.722</td>
<td>33.4%</td>
<td>174</td>
<td>21</td>
</tr>
<tr>
<td>2012</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>2.022</td>
<td>1.495</td>
<td>0.527</td>
<td>26.0%</td>
<td>180</td>
<td>24</td>
</tr>
<tr>
<td>2012</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1.936</td>
<td>1.462</td>
<td>0.474</td>
<td>24.5%</td>
<td>174</td>
<td>21</td>
</tr>
<tr>
<td>2012</td>
<td>12</td>
<td>16</td>
<td>9</td>
<td>1.196</td>
<td>0.726</td>
<td>0.470</td>
<td>39.3%</td>
<td>219</td>
<td>110</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>1</td>
<td>2.131</td>
<td>1.670</td>
<td>0.461</td>
<td>21.6%</td>
<td>115</td>
<td>22</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>22</td>
<td>1.904</td>
<td>1.457</td>
<td>0.447</td>
<td>23.5%</td>
<td>140</td>
<td>22</td>
</tr>
<tr>
<td>2012</td>
<td>12</td>
<td>15</td>
<td>22</td>
<td>1.302</td>
<td>0.856</td>
<td>0.446</td>
<td>34.2%</td>
<td>233</td>
<td>102</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>11</td>
<td>1.918</td>
<td>1.472</td>
<td>0.446</td>
<td>23.2%</td>
<td>196</td>
<td>32</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>20</td>
<td>2.135</td>
<td>1.700</td>
<td>0.435</td>
<td>20.4%</td>
<td>158</td>
<td>28</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>5</td>
<td>1.878</td>
<td>1.445</td>
<td>0.432</td>
<td>23.0%</td>
<td>205</td>
<td>39</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>19</td>
<td>1.595</td>
<td>2.380</td>
<td>-0.785</td>
<td>-49.2%</td>
<td>167</td>
<td>27</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>21</td>
<td>1.502</td>
<td>2.142</td>
<td>-0.639</td>
<td>-42.5%</td>
<td>197</td>
<td>37</td>
</tr>
<tr>
<td>2012</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>1.421</td>
<td>2.037</td>
<td>-0.616</td>
<td>-43.4%</td>
<td>164</td>
<td>27</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>12</td>
<td>1.475</td>
<td>2.069</td>
<td>-0.594</td>
<td>-40.3%</td>
<td>186</td>
<td>30</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>17</td>
<td>1.563</td>
<td>2.148</td>
<td>-0.585</td>
<td>-37.4%</td>
<td>178</td>
<td>22</td>
</tr>
<tr>
<td>2012</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>1.499</td>
<td>2.042</td>
<td>-0.544</td>
<td>-36.3%</td>
<td>188</td>
<td>35</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>20</td>
<td>1.497</td>
<td>2.029</td>
<td>-0.532</td>
<td>-35.6%</td>
<td>197</td>
<td>37</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>6</td>
<td>1.602</td>
<td>2.127</td>
<td>-0.525</td>
<td>-32.8%</td>
<td>172</td>
<td>26</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>22</td>
<td>1.503</td>
<td>1.993</td>
<td>-0.491</td>
<td>-32.7%</td>
<td>189</td>
<td>34</td>
</tr>
<tr>
<td>2012</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1.475</td>
<td>1.952</td>
<td>-0.477</td>
<td>-32.3%</td>
<td>197</td>
<td>37</td>
</tr>
</tbody>
</table>
Maximum Positive Difference: March 1 at 0 hours

BLM Simulation

Figure 4-21: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Maximum Positive Difference)
Second Highest Positive Difference: March 1 at 400 hours

BLM Simulation

Max value: 4.61E+01 at (369, 65)
Min value: 3.52E-01 at (198, 78) non zero cells only
Avg value: 1.09E+00 non zero cells only
Grid Total: 4.15E+04

Difference (BLM-BOEM)

Max value: 5.25E-04 at (190, 24)
Min value: -4.24E-04 at (176, 21) non zero cells only
Avg value: 2.57E-05 non zero cells only
Grid Total: 9.76E-01

Figure 4-22: Comparison of PM$_{2.5}$ Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 base Simulations (Second Highest Positive Difference)
Third Highest Positive Difference: March 1 at 100 hours

BLM Simulation

Max value: 4.400E+1 at (260, 35)
Min value: 3.672E-01 at (166, 81) non zero cells only
Avg value: 1.693E+00 non zero cells only
Grid Total: 4.155E+04

Figure 4-23: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Third Highest Positive Difference)
Fourth Highest Positive Difference: December 16 at 900 hours

BLM Simulation

Max value: 5.321E+01 at (98, 76)
Min value: 3.069E-01 at (195, 46) non zero cells only
Avg value: 1.094E+00 non zero cells only
Grid Total: 4.107E+04

Figure 4-24: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Fourth Highest Positive Difference)
Figure 4-25: Comparison of PM$_{2.5}$ Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 base Simulations (Fifth Highest Positive Difference)
Sixth Highest Positive Difference: February 29 at 2200 hours

BLM Simulation

Max value: 3.718E+01 at (372, 60)
Min value: 9.641E-01 at (377,130) non zero cells only
Avg value: 1.062E+00 non zero cells only
Grid Total: 4.152E+04

Figure 4-26: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Sixth Highest Positive Difference)
Seventh Highest Positive Difference: December 15 at 2200 hours

BLM Simulation

Max value: 4.599E+01 at (269, 85)
Min value: 3.251E-01 at (169, 32) non zero cells only
Avg value: 1.027E+00 non zero cells only
Grid Total: 4.037E+04

Figure 4-27: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Seventh Highest Positive Difference)
Eighth Highest Positive Difference: February 29 at 1100 hours

BLM Simulation

Max value: 3.581E+01 at (162.77)
Min value: 3.733E-01 at (224.139) non zero cells only
Avg value: 1.110E+00 non zero cells only
Grid Total: 4.290E+04

Figure 4-28: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Eighth Highest Positive Difference)
Ninth Highest Positive Difference: February 29 at 2000 hours

BLM Simulation

Max value: 3.603E+01 at (272, 68)
Min value: 8.488E-01 at (377,131) non zero cells only
Avg value: 1.099E+00 non zero cells only
Grid Total: 4.195E+04

Figure 4-29: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Ninth Highest Positive Difference)
Figure 4-30: Comparison of PM$_{2.5}$ Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 base Simulations (Tenth Highest Positive Difference)
Maximum Negative Difference: February 29 at 1900 hours

BLM Simulation

Max value: 4.500E+01 at (162, 77)
Min value: 3.452E-01 at (277,134) non zero cells only
Avg value: 1.106E+00 non zero cells only
Grid Total: 4.314E+04

Figure 4-31: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Maximum Negative Difference)
Figure 4-32: Comparison of PM$_{2.5}$ Concentrations (µg/m$^3$) for BLM and BOEM CAMx 6.20 base Simulations (Second Highest Negative Difference)
Third Highest Negative Difference: March 1 at 300 hours

BLM Simulation

Figure 4-33: Comparison of PM$_{2.5}$ Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 base Simulations (Third Highest Negative Difference)
Figure 4-34: Comparison of PM$_{2.5}$ Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 base Simulations (Fourth Highest Negative Difference)
Fifth Highest Negative Difference: February 29 at 1700 hours

BLM Simulation

Max value: 3.75E+01 at (162, 77)
Min value: 3.407E−01 at (277,139) non zero cells only
Avg value: 1.161E+00 non zero cells only
Grid Total: 4.195E+04

Figure 4-35: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Fifth Highest Negative Difference)
**Sixth Highest Negative Difference: March 1 at 0 hours**

**BLM Simulation**

Max value: 4.25E+01 at (666, 65)
Min value: 3.72E-01 at (166, 70) non zero cells only
Avg value: 1.00E+00 non zero cells only
Grid Total: 4.11E+04

**Difference (BLM-BOEM)**

Max value: 7.22E-01 at (174, 21)
Min value: -5.43E-01 at (199, 35) non zero cells only
Avg value: 2.34E-04 non zero cells only
Grid Total: 6.523E+00

---

**Figure 4-36:** Comparison of PM$_{2.5}$ Concentrations (µg/m$^3$) for BLM and BOEM CAMx 6.20 base Simulations (Sixth Highest Negative Difference)
Seventh Highest Negative Difference: February 29 at 2000 hours

BLM Simulation

Max value: 3.603E+01 at (272, 66)
Min value: 8.408E-01 at (377, 31) non zero cells only
Avg value: 1.099E+00 non zero cells only
Grid Total: 4.195E+04

Figure 4-37: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Seventh Highest Negative Difference)
Eighth Highest Negative Difference: February 29 at 600 hours

**BLM Simulation**

Max value: 3.3795±01 at (162, 77)
Min value: 3.699E-01 at (229,139) non zero cells only
Avg value: 1.125E+00 non zero cells only
Grid Total: 4.305E+04

**Difference (BLM-BOEM)**

Max value: 3.409E-01 at (160, 33)
Min value: -5.256E-01 at (172, 34) non zero cells only
Avg value: -1.738E-04 non zero cells only
Grid Total: -6.225E+00

Figure 4-38: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Eighth Highest Negative Difference)
Ninth Highest Negative Difference: February 29 at 2200 hours

BLM Simulation

Max value: 3.718E+01 at (272, 66)
Min value: 3.641E-01 at (377, 120) non zero cells only
Avg value: 1.058E+00 non zero cells only
Grid Total: 4.122E+04

PM2.5 Concentration
base ag : 120229 : 2200 AKST
1 Hourly Average

Difference (BLM-BOEM)

Max value: 4.468E-01 at (146, 22)
Min value: -4.809E-01 at (186, 34) non zero cells only
Avg value: 1.123E-04 non zero cells only
Grid Total: 4.335E+00

PM2.5 Difference µg/m³
base ag - base : 120229 : 2200
1 Hourly Average

Figure 4-39: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Ninth Highest Negative Difference)
Tenth Highest Negative Difference: March 1 at 100 hours

BLM Simulation

Figure 4-40: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Tenth Highest Negative Difference)
4.3 Sulfate

Sulfate results for the hours resulting in the 10 highest positive and negative concentration differences are presented in Table 4-3. The maximum positive difference is 0.024 µg/m³, falling to 0.009 µg/m³ for the 10th high. The maximum negative difference is -0.031 µg/m³, falling to -0.008 µg/m³ for the 10th high. The maximum positive and negative percent differences are 1.8% and -2.0%, respectively.

The top 10 positive concentration differences hours are presented in Figures 4-41 through 4-50, and the top 10 negative concentration difference hours are presented in Figures 4-51 through 4-60. Basically all the concentration differences (rounded to two decimal places) are below the |0.01| µg/m³ plotting threshold, so no locations appear on the difference plots.
Table 4-3. Comparison of base CAMx 6.20 Simulation Sulfate Concentrations (µg/m³) Run on BLM and BOEM Computer Systems. Hours with the Top 10 Maximum Positive and Maximum Negative Differences are Shown.

<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
<th>Day</th>
<th>Hour</th>
<th>BLM Conc.</th>
<th>BOEM Conc.</th>
<th>Difference (µg/m³)</th>
<th>Percent Difference</th>
<th>Column</th>
<th>Row</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maximum Positive</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>22</td>
<td>0</td>
<td>2.993</td>
<td>2.969</td>
<td>0.024</td>
<td>0.8%</td>
<td>68</td>
<td>58</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>20</td>
<td>20</td>
<td>3.780</td>
<td>3.764</td>
<td>0.016</td>
<td>0.4%</td>
<td>74</td>
<td>28</td>
</tr>
<tr>
<td>2012</td>
<td>8</td>
<td>25</td>
<td>2</td>
<td>1.261</td>
<td>1.249</td>
<td>0.011</td>
<td>0.9%</td>
<td>185</td>
<td>64</td>
</tr>
<tr>
<td>2012</td>
<td>8</td>
<td>24</td>
<td>23</td>
<td>1.376</td>
<td>1.366</td>
<td>0.010</td>
<td>0.7%</td>
<td>159</td>
<td>56</td>
</tr>
<tr>
<td>2012</td>
<td>11</td>
<td>8</td>
<td>6</td>
<td>0.884</td>
<td>0.875</td>
<td>0.009</td>
<td>1.1%</td>
<td>250</td>
<td>58</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>18</td>
<td>0.622</td>
<td>0.612</td>
<td>0.009</td>
<td>1.5%</td>
<td>275</td>
<td>58</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>21</td>
<td>0.592</td>
<td>0.583</td>
<td>0.009</td>
<td>1.6%</td>
<td>87</td>
<td>10</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>20</td>
<td>21</td>
<td>3.058</td>
<td>3.049</td>
<td>0.009</td>
<td>0.3%</td>
<td>94</td>
<td>10</td>
</tr>
<tr>
<td>2012</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>0.504</td>
<td>0.495</td>
<td>0.009</td>
<td>1.8%</td>
<td>258</td>
<td>42</td>
</tr>
<tr>
<td>2012</td>
<td>10</td>
<td>22</td>
<td>20</td>
<td>1.329</td>
<td>1.320</td>
<td>0.009</td>
<td>0.7%</td>
<td>108</td>
<td>68</td>
</tr>
<tr>
<td><strong>Maximum Negative</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>22</td>
<td>2</td>
<td>4.122</td>
<td>4.153</td>
<td>-0.031</td>
<td>-0.8%</td>
<td>191</td>
<td>50</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>21</td>
<td>23</td>
<td>3.476</td>
<td>3.492</td>
<td>-0.016</td>
<td>-0.5%</td>
<td>76</td>
<td>66</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>22</td>
<td>3</td>
<td>4.156</td>
<td>4.170</td>
<td>-0.013</td>
<td>-0.3%</td>
<td>191</td>
<td>50</td>
</tr>
<tr>
<td>2012</td>
<td>8</td>
<td>24</td>
<td>21</td>
<td>1.442</td>
<td>1.453</td>
<td>-0.011</td>
<td>-0.7%</td>
<td>156</td>
<td>17</td>
</tr>
<tr>
<td>2012</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>0.498</td>
<td>0.508</td>
<td>-0.010</td>
<td>-2.0%</td>
<td>74</td>
<td>6</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>20</td>
<td>19</td>
<td>3.642</td>
<td>3.651</td>
<td>-0.009</td>
<td>-0.3%</td>
<td>73</td>
<td>31</td>
</tr>
<tr>
<td>2012</td>
<td>8</td>
<td>24</td>
<td>17</td>
<td>1.668</td>
<td>1.677</td>
<td>-0.009</td>
<td>-0.5%</td>
<td>124</td>
<td>7</td>
</tr>
<tr>
<td>2012</td>
<td>8</td>
<td>24</td>
<td>18</td>
<td>1.669</td>
<td>1.678</td>
<td>-0.009</td>
<td>-0.5%</td>
<td>125</td>
<td>22</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>10</td>
<td>0.613</td>
<td>0.622</td>
<td>-0.008</td>
<td>-1.4%</td>
<td>74</td>
<td>6</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>20</td>
<td>23</td>
<td>4.363</td>
<td>4.372</td>
<td>-0.008</td>
<td>-0.2%</td>
<td>86</td>
<td>62</td>
</tr>
</tbody>
</table>
Maximum Positive Difference: June 22 at 0 hours

BLM Simulation

Figure 4-41: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 base Simulations (Maximum Positive Difference)
Second Highest Positive Difference: June 20 at 2000 hours

BLM Simulation

Max value: 5.55E+00 at (51, 18)
Min value: 9.21E-01 at (366, 52) non zero cells only
Avg value: 2.168E+00 non zero cells only
Grid Total: 1.207E+05

Figure 4-42: Comparison of Sulfate Concentrations (μg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Second Highest Positive Difference)
Figure 4-43: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Third Highest Positive Difference)
Fourth Highest Positive Difference: August 24 at 2300 hours

BLM Simulation

Max value: 3.780E+09 at (152, 85)
Min value: 6.795E-08 at (45, 24) non zero cells only
Avg value: 1.159E+00 non zero cells only
Grid Total: 4.405E+04

Figure 4-44: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Fourth Highest Positive Difference)
Figure 4-45: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx
6.20 base Simulations (Fifth Highest Positive Difference)
Sixth Highest Positive Difference: February 29 at 1800 hours

BLM Simulation

Max value: 2.759E+09 at (162, 77)
Min value: 1.552E-01 at (377,197) non zero cells only
Avg value: 2.994E-01 non zero cells only
Grid Total: 1.130E+04

Figure 4-46: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Sixth Highest Positive Difference)
Seventh Highest Positive Difference: February 29 at 2100 hours

BLM Simulation

Max value: 2.191E+00 at (272, 66)
Min value: 1.557E-01 at (177, 65) non zero cells only
Avg value: 2.913E-01 non zero cells only
Grid Total: 1.120E+04

Figure 4-47: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Seventh Highest Positive Difference)
Eighth Highest Positive Difference: June 20 at 2100 hours

BLM Simulation

Max value: 5.736E+09 at (53, 23)
Min value: 8.3620E-01 at (206, 59) non zero cells only
Avg value: 3.2046E+00 non zero cells only
Grid Total: 1.220E+05

Figure 4-48: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Eighth Highest Positive Difference)
Figure 4-49: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Ninth Highest Positive Difference)
Tenth Highest Positive Difference: October 22 at 2000 hours

BLM Simulation

Max value: 2.498E+09 at (19, 29)
Min value: 2.885E-01 at (183, 29) non zero cells only
Avg value: 1.094E+00 non zero cells only
Grid Total: 3.854E+04

Figure 4-50: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Tenth Highest Positive Difference)
Maximum Negative Difference: June 22 at 200 hours

BLM Simulation

![Map and graph showing comparison of sulfate concentrations between BLM and BOEM CAMx simulations.]

Max value: 5.584E+09 at (99, 85)
Min value: 1.619E-01 at (2,139) non zero cells only
Avg value: 3.327E+08 non zero cells only
Grid Total: 1.267E+05

Figure 4-51: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Maximum Negative Difference)
Figure 4-52: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Second Highest Negative Difference)
Figure 4-53: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 base Simulations (Third Highest Negative Difference)
Fourth Highest Negative Difference: August 24 at 2100 hours
BLM Simulation

Max value: 3.761E+09 at (149, 85)
Min value: 6.899E-02 at (83, 34) non zero cells only
Avg value: 1.196E+00 non zero cells only
Grid Total: 4.566E+04

Figure 4-54: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Fourth Highest Negative Difference)
Fifth Highest Negative Difference: March 1 at 400 hours

BLM Simulation

Max value: 2.804E+09 at (269, 85)
Min value: 1.505E-04 at (165, 81) non zero cells only
Avg value: 2.652E-04 non zero cells only
Grid Total: 1.966E+04

Figure 4-55: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Fifth Highest Negative Difference)
Sixth Highest Negative Difference: June 20 at 1900 hours

BLM Simulation

Max value: 5.45E+09 at (122, 96)
Min value: 1.09E+08 at (270, 51) non zero cells only
Avg value: 3.11E+08 non zero cells only
Grid Total: 1.16E+09

Figure 4-56: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx
6.20 base Simulations (Sixth Highest Negative Difference)
Seventh Highest Negative Difference: August 24 at 1700 hours

BLM Simulation

Max value: 2.95E+90 at (163, 77)
Min value: 4.99E-01 at (269, 53) non zero cells only
Avg value: 1.27E+00 non zero cells only
Grid Total: 4.35E+84

Figure 4-57: Comparison of Sulfate Concentrations (µg/m$^3$) for BLM and BOEM CAMx 6.20 base Simulations (Seventh Highest Negative Difference)
Eighth Highest Negative Difference: August 24 at 1800 hours

BLM Simulation

Max value: 3.03E+00 at (163, 77)
Min value: 4.92E-01 at (275, 69) non zero cells only
Avg value: 1.26E+00 non zero cells only
Grid Total: 4.935E+04

Figure 4-58: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Eighth Highest Negative Difference)
Ninth Highest Negative Difference: February 29 at 1000 hours

BLM Simulation

Max value: 2.234E+09 at (162, 77)
Min value: 1.616E-01 at (141, 54) non zero cells only
Avg value: 3.602E-01 non zero cells only
Grid Total: 1.170E+04

Figure 4-59: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Ninth Highest Negative Difference)
Tenth Highest Negative Difference: June 20 at 2300 hours

BLM Simulation

Max value: 5.903E+00 at (52, 21)
Min value: 5.215E-01 at (206, 50) non zero cells only
Avg value: 3.2925E+00 non zero cells only
Grid Total: 1.243E+05

Figure 4-60: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Tenth Highest Negative Difference)
4.4 Nitrate

Nitrate results for the hours resulting in the 10 highest positive and negative concentration differences are presented in Table 4-4. The maximum positive difference is 0.715 µg/m³, falling to 0.429 µg/m³ for the 10th high. The maximum negative difference is -0.790 µg/m³, falling to -0.483 µg/m³ for the 10th high. The maximum positive and negative percent differences are 80.6% and -180.6%, both on low nitrate concentration days.

The top 10 positive concentration difference hours are presented in Figures 4-61 through 4-70, and the top 10 negative concentration difference hours are presented in Figures 4-71 through 4-80. As was discussed in Section 4.2 for the PM$_{2.5}$ concentrations, the differences tend to occur over the elevated terrain in the Brooks Range and offshore. The differences in the PM$_{2.5}$ concentrations are primarily from nitrate. The maximum positive difference for PM$_{2.5}$ is 0.722 µg/m³, and the difference at that same grid cell and hour for nitrate is 0.715 µg/m³.

We speculate that the differences are most likely from different pathways being taken in the ISORROPIA algorithm.
Table 4-4. Comparison of base CAMx 6.20 Simulation Nitrate Concentrations (µg/m³) Run on BLM and BOEM Computer Systems. Hours with the Top 10 Maximum Positive and Maximum Negative Differences are Shown.

<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
<th>Day</th>
<th>Hour</th>
<th>BLM Conc.</th>
<th>BOEM Conc.</th>
<th>Difference (µg/m³)</th>
<th>Percent Difference</th>
<th>Column</th>
<th>Row</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>0.990</td>
<td>0.275</td>
<td>0.715</td>
<td>72.2%</td>
<td>174</td>
<td>21</td>
</tr>
<tr>
<td>2012</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>0.961</td>
<td>0.427</td>
<td>0.534</td>
<td>55.6%</td>
<td>180</td>
<td>24</td>
</tr>
<tr>
<td>2012</td>
<td>12</td>
<td>16</td>
<td>9</td>
<td>0.599</td>
<td>0.116</td>
<td>0.482</td>
<td>80.6%</td>
<td>219</td>
<td>110</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>1</td>
<td>0.990</td>
<td>0.512</td>
<td>0.478</td>
<td>48.3%</td>
<td>115</td>
<td>22</td>
</tr>
<tr>
<td>2012</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>0.780</td>
<td>0.308</td>
<td>0.472</td>
<td>60.5%</td>
<td>174</td>
<td>21</td>
</tr>
<tr>
<td>2012</td>
<td>12</td>
<td>15</td>
<td>22</td>
<td>0.611</td>
<td>0.146</td>
<td>0.465</td>
<td>76.1%</td>
<td>233</td>
<td>102</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>22</td>
<td>0.856</td>
<td>0.405</td>
<td>0.452</td>
<td>52.8%</td>
<td>140</td>
<td>22</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>5</td>
<td>0.879</td>
<td>0.436</td>
<td>0.444</td>
<td>50.4%</td>
<td>205</td>
<td>39</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>11</td>
<td>0.818</td>
<td>0.375</td>
<td>0.444</td>
<td>54.2%</td>
<td>196</td>
<td>32</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>20</td>
<td>1.026</td>
<td>0.597</td>
<td>0.429</td>
<td>41.8%</td>
<td>158</td>
<td>28</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
<th>Day</th>
<th>Hour</th>
<th>BLM Conc.</th>
<th>BOEM Conc.</th>
<th>Difference (µg/m³)</th>
<th>Percent Difference</th>
<th>Column</th>
<th>Row</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>19</td>
<td>0.437</td>
<td>1.227</td>
<td>-0.790</td>
<td>-180.6%</td>
<td>167</td>
<td>27</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>21</td>
<td>0.501</td>
<td>1.135</td>
<td>-0.634</td>
<td>-126.4%</td>
<td>197</td>
<td>37</td>
</tr>
<tr>
<td>2012</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>0.359</td>
<td>0.981</td>
<td>-0.622</td>
<td>-173.3%</td>
<td>164</td>
<td>27</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>12</td>
<td>0.364</td>
<td>0.972</td>
<td>-0.607</td>
<td>-166.7%</td>
<td>186</td>
<td>30</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>17</td>
<td>0.379</td>
<td>0.976</td>
<td>-0.596</td>
<td>-157.2%</td>
<td>178</td>
<td>22</td>
</tr>
<tr>
<td>2012</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>0.486</td>
<td>1.031</td>
<td>-0.545</td>
<td>-112.3%</td>
<td>188</td>
<td>35</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>20</td>
<td>0.467</td>
<td>1.007</td>
<td>-0.540</td>
<td>-115.5%</td>
<td>197</td>
<td>37</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>6</td>
<td>0.469</td>
<td>1.006</td>
<td>-0.537</td>
<td>-114.6%</td>
<td>172</td>
<td>26</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>22</td>
<td>0.450</td>
<td>0.945</td>
<td>-0.495</td>
<td>-109.9%</td>
<td>189</td>
<td>34</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>9</td>
<td>0.502</td>
<td>0.985</td>
<td>-0.483</td>
<td>-96.3%</td>
<td>142</td>
<td>25</td>
</tr>
</tbody>
</table>
Maximum Positive Difference: March 1 at 0 hours
BLM Simulation

Max value: 1.33E+00 at 0267, 601
Min value: 5.76E-02 at (277,105) non zero cells only
Avg value: 2.59E-01 non zero cells only
Grid Total: 0.79E+06

Figure 4-61: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Maximum Positive Difference)
Figure 4-62: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Second Highest Positive Difference)
Third Highest Positive Difference: December 16 at 900 hours

BLM Simulation

Max value: 1.900E+0 at (264, 74)
Min value: 2.616E-03 at (301, 44) non zero cells only
Avg value: 2.148E-01 non zero cells only
Grid Total: 6.156E+03

Difference (BLM-BOEM)

Max value: 4.364E-01 at (219, 110)
Min value: -1.684E-01 at (260, 107) non zero cells only
Avg value: 1.050E-04 non zero cells only
Grid Total: 3.919E+00

Figure 4-63: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Third Highest Positive Difference)
Fourth Highest Positive Difference: February 29 at 100 hours

BLM Simulation

Max value: 1.365E+00 at (83, 24)
Min value: 2.328E-05 at (106, 5) non zero cells only
Avg value: 2.237E-01 non zero cells only
Grid Total: 1.042E+04

Figure 4-64: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Fourth Highest Positive Difference)
Fifth Highest Positive Difference: March 1 at 100 hours

BLM Simulation

Figure 4-65: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx
6.20 base Simulations (Fifth Highest Positive Difference)
Sixth Highest Positive Difference: December 15 at 2200 hours

BLM Simulation

Max value: $1.357E+00$ at (271, 72)
Min value: $1.991E-03$ at (179, 23) non zero cells only
Avg value: $2.059E-01$ non zero cells only
Grid Total: $7.844E+03$

Figure 4-66: Comparison of Nitrate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 base Simulations (Sixth Highest Positive Difference)
Seventh Highest Positive Difference: February 29 at 2200 hours

BLM Simulation

**Max value:** 1.206E+20 at 0268, 601
**Min value:** 5.609E-05 at (277.107) non zero cells only
**Avg value:** 2.610E-01 non zero cells only
**Grid Total:** 9.939E+03

**Figure 4-67: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Seventh Highest Positive Difference)**
Eighth Highest Positive Difference: February 29 at 500 hours

BLM Simulation

Max value: 1.393E+00 at (83, 24)
Min value: 3.153E-02 at (191, 6) non zero cells only
Avg value: 2.748E-01 non zero cells only
Grid Total: 1.940E+04

Figure 4-68: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Eighth Highest Positive Difference)
Figure 4-69: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Ninth Highest Positive Difference)
Figure 4-70: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Tenth Highest Positive Difference)
Figure 4-71: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Maximum Negative Difference)
Figure 4-72: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Second Highest Negative Difference)
Figure 4-73: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Third Highest Negative Difference)
Fourth Highest Negative Difference: February 29 at 1200 hours

BLM Simulation

Max value: 1.353E+00 at (36, 5)
Min value: 5.769E-02 at (237,139) non zero cells only
Avg value: 2.729E-01 non zero cells only
Grid Total: 1.939E+04

Figure 4-74: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx
6.20 base Simulations (Fourth Highest Negative Difference)
Figure 4-75: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Fifth Highest Negative Difference)
Sixth Highest Negative Difference: March 1 at 0 hours

BLM Simulation

Max value: 1.301E+09 at (267, 60)
Min value: 5.781E-02 at (277,192) non-zero cells only
Avg value: 2.973E-01 non-zero cells only
Grid Total: 9.799E+03

Figure 4-76: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Sixth Highest Negative Difference)
Figure 4-77: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Seventh Highest Negative Difference)
Figure 4-78: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Eighth Highest Negative Difference)
Figure 4-79: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Ninth Highest Negative Difference)
Figure 4-80: Comparison of Nitrate Concentrations ($\mu g/m^3$) for BLM and BOEM CAMx 6.20 base Simulations (Tenth Highest Negative Difference)
4.5 Organic Carbon (OC)

Organic Carbon (OC) results for the hours resulting in the 10 highest positive and negative concentration differences are presented in Table 4-5. The differences are small. The maximum positive difference is 0.003 µg/m³, falling to 0.002 µg/m³ for the 10th high. The maximum negative difference is -0.003 µg/m³, falling to -0.001 µg/m³ for the 10th high. The maximum positive and negative percent differences are 0.7% and -0.9%, respectively.

The top 10 positive concentration difference hours are presented in Figures 4-81 through 4-90, and the top 10 negative concentration difference hours are presented in Figures 4-91 through 4-100. No differences are over the |0.01| µg/m³ plotting threshold, so none appear on the difference plots.
Table 4-5. Comparison of base CAMx 6.20 Simulation Organic Carbon Concentrations (µg/m^3) Run on BLM and BOEM Computer Systems. Hours with the Top 10 Maximum Positive and Maximum Negative Differences are Shown.

<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
<th>Day</th>
<th>Hour</th>
<th>BLM Conc.</th>
<th>BOEM Conc.</th>
<th>Difference (µg/m^3)</th>
<th>Percent Difference</th>
<th>Column</th>
<th>Row</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Maximum Positive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>8</td>
<td>19</td>
<td>18</td>
<td>2.222</td>
<td>2.219</td>
<td>0.003</td>
<td>0.1%</td>
<td>275</td>
<td>42</td>
</tr>
<tr>
<td>2012</td>
<td>8</td>
<td>13</td>
<td>1</td>
<td>0.347</td>
<td>0.345</td>
<td>0.003</td>
<td>0.7%</td>
<td>150</td>
<td>41</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>23</td>
<td>3</td>
<td>3.676</td>
<td>3.674</td>
<td>0.002</td>
<td>0.1%</td>
<td>168</td>
<td>4</td>
</tr>
<tr>
<td>2012</td>
<td>8</td>
<td>24</td>
<td>6</td>
<td>0.436</td>
<td>0.434</td>
<td>0.002</td>
<td>0.5%</td>
<td>181</td>
<td>59</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>19</td>
<td>2</td>
<td>3.363</td>
<td>3.361</td>
<td>0.002</td>
<td>0.1%</td>
<td>140</td>
<td>40</td>
</tr>
<tr>
<td>2012</td>
<td>7</td>
<td>9</td>
<td>22</td>
<td>2.572</td>
<td>2.570</td>
<td>0.002</td>
<td>0.1%</td>
<td>86</td>
<td>10</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>18</td>
<td>22</td>
<td>1.056</td>
<td>1.054</td>
<td>0.002</td>
<td>0.2%</td>
<td>184</td>
<td>52</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>18</td>
<td>19</td>
<td>2.563</td>
<td>2.561</td>
<td>0.002</td>
<td>0.1%</td>
<td>172</td>
<td>38</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>17</td>
<td>18</td>
<td>5.055</td>
<td>5.054</td>
<td>0.002</td>
<td>0.0%</td>
<td>132</td>
<td>26</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>17</td>
<td>19</td>
<td>4.171</td>
<td>4.169</td>
<td>0.002</td>
<td>0.0%</td>
<td>131</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Maximum Negative</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>19</td>
<td>3</td>
<td>2.751</td>
<td>2.753</td>
<td>-0.003</td>
<td>-0.1%</td>
<td>141</td>
<td>41</td>
</tr>
<tr>
<td>2012</td>
<td>8</td>
<td>6</td>
<td>14</td>
<td>0.672</td>
<td>0.675</td>
<td>-0.002</td>
<td>-0.4%</td>
<td>176</td>
<td>14</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>18</td>
<td>23</td>
<td>3.191</td>
<td>3.193</td>
<td>-0.002</td>
<td>-0.1%</td>
<td>138</td>
<td>33</td>
</tr>
<tr>
<td>2012</td>
<td>8</td>
<td>12</td>
<td>7</td>
<td>0.281</td>
<td>0.283</td>
<td>-0.002</td>
<td>-0.6%</td>
<td>158</td>
<td>2</td>
</tr>
<tr>
<td>2012</td>
<td>7</td>
<td>11</td>
<td>23</td>
<td>1.211</td>
<td>1.213</td>
<td>-0.002</td>
<td>-0.1%</td>
<td>86</td>
<td>12</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>18</td>
<td>20</td>
<td>2.002</td>
<td>2.004</td>
<td>-0.002</td>
<td>-0.1%</td>
<td>176</td>
<td>43</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>18</td>
<td>19</td>
<td>2.392</td>
<td>2.394</td>
<td>-0.002</td>
<td>-0.1%</td>
<td>170</td>
<td>38</td>
</tr>
<tr>
<td>2012</td>
<td>12</td>
<td>8</td>
<td>7</td>
<td>0.156</td>
<td>0.157</td>
<td>-0.001</td>
<td>-0.9%</td>
<td>173</td>
<td>63</td>
</tr>
<tr>
<td>2012</td>
<td>8</td>
<td>12</td>
<td>0</td>
<td>0.321</td>
<td>0.323</td>
<td>-0.001</td>
<td>-0.4%</td>
<td>248</td>
<td>19</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>26</td>
<td>9</td>
<td>0.258</td>
<td>0.259</td>
<td>-0.001</td>
<td>-0.5%</td>
<td>186</td>
<td>68</td>
</tr>
</tbody>
</table>
Figure 4-81: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Maximum Positive Difference)
Figure 4-82: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Second Highest Positive Difference)
Third Highest Positive Difference: June 23 at 300 hours

BLM Simulation

Max value: 1.065E+01 at (136, 30)
Min value: 5.69E-04 at (55, 123) non zero cells only
Avg value: 1.12E-01 non zero cells only
Grid Total: 4.59E+03

Figure 4-83: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Third Highest Positive Difference)
Fourth Highest Positive Difference: August 24 at 600 hours

BLM Simulation

Max value: 3.630E+00 at (122, 96)
Min value: 4.654E-03 at (20, 46) non zero cells only
Avg value: 2.061E-01 non zero cells only
Grid Total: 7.889E+03

Difference (BLM-BOEM)

Max value: 2.514E-03 at (181, 59)
Min value: -4.692E-04 at (101, 59) non zero cells only
Avg value: 2.132E-07 non zero cells only
Grid Total: 6.999E-03

Figure 4-84: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Fourth Highest Positive Difference)
Fifth Highest Positive Difference: June 19 at 200 hours

BLM Simulation

Max value: 1.641E+91 at (138, 39)
Min value: 6.167E-03 at (-4, 4) non zero cells only
Avg value: 1.566E-01 non zero cells only
Grid Total: 5.993E+03

Figure 4-85: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Fifth Highest Positive Difference)
Figure 4-86: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Sixth Highest Positive Difference)
Seventh Highest Positive Difference: June 18 at 2200 hours

BLM Simulation

Max value: 2.69E+01 at (132, 31)
Min value: 6.26E-03 at (4, 2) non zero cells only
Avg value: 1.40E-01 non zero cells only
Grid Total: 5.95E+03

Figure 4-87: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Seventh Highest Positive Difference)
Figure 4-88: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Eighth Highest Positive Difference)
Ninth Highest Positive Difference: June 17 at 1800 hours

BLM Simulation

Max value: 6.877E+01 at (131, 30)
Min value: 4.939E-03 at (203, 86) non zero cells only
Avg value: 6.886E-02 non zero cells only
Grid Total: 2.599E+03

Figure 4-89: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Ninth Highest Positive Difference)
Figure 4-90: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Tenth Highest Positive Difference)
Maximum Negative Difference: June 19 at 300 hours

BLM Simulation

**Maximum Negative Difference**

- **Max value:** 1.956E+01 at (136, 39)
- **Min value:** 5.834E-03 at (4, 2) non zero cells only
- **Avg value:** 1.552E-01 non zero cells only
- **Grid Total:** 5.799E+03

**Difference (BLM-BOEM)**

- **Max value:** 5.307E-03 at (136, 40)
- **Min value:** -2.592E-03 at (141, 41) non zero cells only
- **Avg value:** -2.994E-07 non zero cells only
- **Grid Total:** -9.501E-03

**Figure 4-91:** Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Maximum Negative Difference)
Second Highest Negative Difference: August 6 at 1400 hours

BLM Simulation

Max value: 1.807E+00 at (132, 96)
Min value: 9.000E-04 at (235, 111) non zero cells only
Avg value: 9.120E-02 non zero cells only
Grid Total: 3.474E+03

Figure 4-92: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Second Highest Negative Difference)
Figure 4-93: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Third Highest Negative Difference)
Fourth Highest Negative Difference: August 12 at 700 hours

BLM Simulation

Max value: 8.902E+00 at (122, 90)
Min value: 3.697E-03 at (398,190) non zero cells only
Avg value: 1.699E-01 non zero cells only
Grid Total: 7.164E+03

Difference (BLM-BOEM)

Max value: 7.996E-04 at (238, 45)
Min value: -1.054E-03 at (156, 2) non zero cells only
Avg value: 5.273E-08 non zero cells only
Grid Total: 1.697E-03

Figure 4-94: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Fourth Highest Negative Difference)
Fifth Highest Negative Difference: July 11 at 2300 hours

BLM Simulation

Max value: 6.827E+01 at ( 60,  5)
Min value: 5.705E+05 at (277,110) non zero cells only
Avg value: 2.562E-01 non zero cells only
Grid Total: 9.605E+03

Figure 4-95: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Fifth Highest Negative Difference)
Sixth Highest Negative Difference: June 18 at 2000 hours
BLM Simulation

![Image of OC Concentrations for BLM and BOEM CAMx 6.20 base Simulations](image)

**Figure 4-96: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Sixth Highest Negative Difference)**
Seventh Highest Negative Difference: June 18 at 1900 hours

BLM Simulation

Max value: 8.844E+01 at (134, 39)
Min value: 9.179E-05 at (377,130) non zero cells only
Avg value: 1.274E-01 non zero cells only
Grid Total: 4.854E+03

Figure 4-97: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Seventh Highest Negative Difference)
Eighth Highest Negative Difference: December 8 at 700 hours

BLM Simulation

Figure 4-98: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Eighth Highest Negative Difference)
Figure 4-99: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Ninth Highest Negative Difference)
Figure 4-100: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 base Simulations (Tenth Highest Negative Difference)
5.0 CAMX 6.20 FY2020 COMPARISON

This section presents comparisons of the future year (2020) simulations using CAMx 6.20 performed on the Alpine and BOEM computer systems.

5.1 Ozone

Ozone results for the hours resulting in the 10 highest positive and negative concentration differences are presented in Table 5-1. The differences are very small. The maximum positive difference is 0.008 ppb, falling to 0.003 ppb for the 10th high. The maximum negative difference is -0.004 ppb, falling to -0.002 ppb for the 10th high. The highest differences occur on hours with relatively low ozone concentrations, ranging from 7 ppb to 41 ppb for the BOEM simulation. The maximum positive and negative percent differences are 0.1% and -0.0%, respectively.

The top ten positive concentration difference hours are presented in Figures 5-1 through 5-10, and the top ten negative concentration difference hours are presented in Figures 5-11 through 5-20. No grid cells have concentration differences (rounded to two decimal places) over the |0.01| ppb plotting threshold, so no locations appear on the difference plots.
Table 5-1. Comparison of fy2020 CAMx 6.20 Simulation Ozone Concentrations (ppb) Run on BLM and BOEM Computer Systems. Hours with the Top 10 Maximum Positive and Maximum Negative Differences are Shown.

<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
<th>Day</th>
<th>Hour</th>
<th>BLM Conc.</th>
<th>BOEM Conc.</th>
<th>Difference (ppb)</th>
<th>Percent Difference</th>
<th>Column</th>
<th>Row</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.008</td>
<td>0.1%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>15</td>
<td>13</td>
<td>29.921</td>
<td>29.925</td>
<td>-0.004</td>
<td>-0.0%</td>
<td>249</td>
<td>67</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>15</td>
<td>18</td>
<td>36.864</td>
<td>36.867</td>
<td>-0.003</td>
<td>-0.0%</td>
<td>196</td>
<td>59</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>15</td>
<td>14</td>
<td>30.625</td>
<td>30.628</td>
<td>-0.003</td>
<td>-0.0%</td>
<td>249</td>
<td>66</td>
</tr>
<tr>
<td>2012</td>
<td>7</td>
<td>12</td>
<td>19</td>
<td>39.933</td>
<td>39.936</td>
<td>-0.003</td>
<td>-0.0%</td>
<td>207</td>
<td>52</td>
</tr>
<tr>
<td>2012</td>
<td>7</td>
<td>12</td>
<td>16</td>
<td>36.591</td>
<td>36.594</td>
<td>-0.003</td>
<td>-0.0%</td>
<td>267</td>
<td>57</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>15</td>
<td>15</td>
<td>31.099</td>
<td>31.101</td>
<td>-0.003</td>
<td>-0.0%</td>
<td>249</td>
<td>65</td>
</tr>
<tr>
<td>2012</td>
<td>7</td>
<td>12</td>
<td>20</td>
<td>37.315</td>
<td>37.318</td>
<td>-0.002</td>
<td>-0.0%</td>
<td>202</td>
<td>51</td>
</tr>
<tr>
<td>2012</td>
<td>7</td>
<td>12</td>
<td>17</td>
<td>35.871</td>
<td>35.874</td>
<td>-0.002</td>
<td>-0.0%</td>
<td>265</td>
<td>56</td>
</tr>
</tbody>
</table>

Maximum Positive
Figure 5-1: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Maximum Positive Difference)
Second Highest Positive Difference: July 12 at 2000 hours
BLM Simulation

Figure 5-2: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Second Highest Positive Difference)
Figure 5-3: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Third Highest Positive Difference)
Fourth Highest Positive Difference: September 4 at 1500 hours

BLM Simulation

Max value: 4.196E+01 at (170. 6)
Min value: 1.652E+01 at (207. 72) non zero cells only
Avg value: 2.701E+01 non zero cells only
Grid Total: 1.069E+00

Figure 5-4: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fourth Highest Positive Difference)
Figure 5-5: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fourth Highest Positive Difference)
Figure 5-6: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Sixth Highest Positive Difference)
Figure 5-7: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Seventh Highest Positive Difference)
Figure 5-8: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Eighth Highest Positive Difference)
Ninth Highest Positive Difference: February 26 at 1400 hours

BLM Simulation

Figure 5-9: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Ninth Highest Positive Difference)
Figure 5-10: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Tenth Highest Positive Difference)
Maximum Negative Difference: June 15 at 1300 hours

BLM Simulation

Maximum Negative Difference:
June 15 at 1300 hours

BLM Simulation Difference (BLM-BOEM)

Figure 5-11: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Maximum Negative Difference)
Second Highest Negative Difference: June 15 at 1800 hours

BLM Simulation

<table>
<thead>
<tr>
<th>Max value: 5.06E+01 at (263, 17)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min value: 6.64E-01 at (94, 92) non zero cells only</td>
</tr>
<tr>
<td>Avg value: 3.06E+01 non zero cells only</td>
</tr>
<tr>
<td>Grid Total: 1.19E+06</td>
</tr>
</tbody>
</table>

Figure 5-12: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Second Highest Negative Difference)
Third Highest Negative Difference: February 29 at 1300 hours

BLM Simulation

**Figure 5-13:** Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Third Highest Negative Difference)
Fourth Highest Negative Difference: July 12 at 1800 hours
BLM Simulation

Figure 5-14: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fourth Highest Negative Difference)
Figure 5-15: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fifth Highest Negative Difference)
Sixth Highest Negative Difference: July 12 at 1900 hours

BLM Simulation

Figure 5-16: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Sixth Highest Negative Difference)
Seventh Highest Negative Difference: July 12 at 1600 hours

BLM Simulation

Max value: 4.66E+01 at (147, 65)
Min value: 3.549E+00 at (52, 96) non zero cells only
Avg value: 2.760E+01 non zero cells only
Grid Total: 1.051E+08

Figure 5-17: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Seventh Highest Negative Difference)
Figure 5-18: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Eighth Highest Negative Difference)
Figure 5-19: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Ninth Highest Negative Difference)
Tenth Highest Negative Difference: July 12 at 1700 hours
BLM Simulation

Figure 5-20: Comparison of Ozone Concentrations (ppb) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Tenth Highest Negative Difference)
5.2 PM$_{2.5}$

PM$_{2.5}$ results for the hours resulting in the 10 highest positive and negative concentration differences are presented in Table 5-2. The maximum positive difference is 0.576 $\mu$g/m$^3$, falling to 0.453 $\mu$g/m$^3$ for the 10$^{th}$ high. The maximum negative difference is -1.259 $\mu$g/m$^3$, falling to -0.549 $\mu$g/m$^3$ for the 10$^{th}$ high. The maximum positive and negative percent differences are 40.9% and -74.8%, respectively, both on low PM$_{2.5}$ concentration days.

The top 10 positive concentration difference hours are presented in Figures 5-21 through 5-30, and the top 10 negative concentration difference hours are presented in Figures 5-31 through 5-40. The locations of the impacts are, again, scattered over the elevated terrain in the Brooks Range or in offshore regions with a mix of positive and negative differences in the same region.

Comparison with the nitrate results in Section 5.4 shows that on many days the principal difference in the PM$_{2.5}$ concentrations is a result of the differences in the nitrate predictions. We speculate that the differences are primarily from the difference in the nitrate and most likely from different pathways being taken in the ISORROPIA algorithm.
Table 5-2. Comparison of fy2020 CAMx 6.20 Simulation PM$_{2.5}$ Concentrations (µg/m$^3$) Run on BLM and BOEM Computer Systems. Hours with the Top 10 Maximum Positive and Maximum Negative Differences are Shown.

<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
<th>Day</th>
<th>Hour</th>
<th>BLM Conc.</th>
<th>BOEM Conc.</th>
<th>Difference (µg/m$^3$)</th>
<th>Percent Difference</th>
<th>Column</th>
<th>Row</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Maximum Positive</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>12</td>
<td>15</td>
<td>19</td>
<td>1.515</td>
<td>0.939</td>
<td>0.576</td>
<td>38.0%</td>
<td>231</td>
<td>103</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>18</td>
<td>2.102</td>
<td>1.526</td>
<td>0.575</td>
<td>27.4%</td>
<td>198</td>
<td>29</td>
</tr>
<tr>
<td>2012</td>
<td>12</td>
<td>15</td>
<td>23</td>
<td>1.422</td>
<td>0.871</td>
<td>0.551</td>
<td>38.7%</td>
<td>244</td>
<td>94</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>19</td>
<td>2.179</td>
<td>1.648</td>
<td>0.531</td>
<td>24.4%</td>
<td>177</td>
<td>21</td>
</tr>
<tr>
<td>2012</td>
<td>12</td>
<td>16</td>
<td>1</td>
<td>1.445</td>
<td>0.925</td>
<td>0.520</td>
<td>36.0%</td>
<td>237</td>
<td>102</td>
</tr>
<tr>
<td>2012</td>
<td>12</td>
<td>15</td>
<td>22</td>
<td>1.432</td>
<td>0.922</td>
<td>0.509</td>
<td>35.6%</td>
<td>238</td>
<td>99</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>21</td>
<td>1.815</td>
<td>1.308</td>
<td>0.506</td>
<td>27.9%</td>
<td>181</td>
<td>26</td>
</tr>
<tr>
<td>2012</td>
<td>12</td>
<td>16</td>
<td>6</td>
<td>1.231</td>
<td>0.727</td>
<td>0.504</td>
<td>40.9%</td>
<td>230</td>
<td>105</td>
</tr>
<tr>
<td>2012</td>
<td>11</td>
<td>25</td>
<td>5</td>
<td>3.812</td>
<td>3.356</td>
<td>0.456</td>
<td>12.0%</td>
<td>67</td>
<td>109</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>2</td>
<td>2.148</td>
<td>1.695</td>
<td>0.453</td>
<td>21.1%</td>
<td>139</td>
<td>30</td>
</tr>
<tr>
<td><strong>Maximum Negative</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>11</td>
<td>25</td>
<td>3</td>
<td>3.024</td>
<td>4.284</td>
<td>-1.259</td>
<td>-41.6%</td>
<td>69</td>
<td>101</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>18</td>
<td>1.595</td>
<td>2.447</td>
<td>-0.852</td>
<td>-53.4%</td>
<td>191</td>
<td>30</td>
</tr>
<tr>
<td>2012</td>
<td>11</td>
<td>25</td>
<td>7</td>
<td>3.080</td>
<td>3.781</td>
<td>-0.701</td>
<td>-22.8%</td>
<td>72</td>
<td>110</td>
</tr>
<tr>
<td>2012</td>
<td>12</td>
<td>16</td>
<td>1</td>
<td>0.951</td>
<td>1.550</td>
<td>-0.599</td>
<td>-63.0%</td>
<td>226</td>
<td>114</td>
</tr>
<tr>
<td>2012</td>
<td>3</td>
<td>1</td>
<td>6</td>
<td>1.344</td>
<td>1.933</td>
<td>-0.589</td>
<td>-43.8%</td>
<td>152</td>
<td>20</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>21</td>
<td>1.508</td>
<td>2.089</td>
<td>-0.581</td>
<td>-38.5%</td>
<td>174</td>
<td>31</td>
</tr>
<tr>
<td>2012</td>
<td>12</td>
<td>15</td>
<td>14</td>
<td>0.949</td>
<td>1.507</td>
<td>-0.558</td>
<td>-58.8%</td>
<td>232</td>
<td>96</td>
</tr>
<tr>
<td>2012</td>
<td>12</td>
<td>15</td>
<td>20</td>
<td>0.741</td>
<td>1.295</td>
<td>-0.554</td>
<td>-74.8%</td>
<td>239</td>
<td>104</td>
</tr>
<tr>
<td>2012</td>
<td>11</td>
<td>25</td>
<td>4</td>
<td>2.512</td>
<td>3.063</td>
<td>-0.550</td>
<td>-21.9%</td>
<td>69</td>
<td>107</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>5</td>
<td>1.701</td>
<td>2.250</td>
<td>-0.549</td>
<td>-32.3%</td>
<td>144</td>
<td>29</td>
</tr>
</tbody>
</table>
Maximum Positive Difference: December 15 at 1900 hours

BLM Simulation

Figure 5-21: Comparison of PM$_{2.5}$ Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Maximum Positive Difference)
Second Highest Positive Difference: February 29 at 1800 hours

BLM Simulation

| Max value: 4.571E+01 at (162, 77) |
| Min value: 3.405E-01 at (277,137) non zero cells only |
| Avg value: 1.144E+00 non zero cells only |
| Grid Total: 4.390E+04 |

![BLM Simulation Graph]

**PM2.5 Conc.**

*fy2020:ag : 120229 : 1800 AKST*

1 Hourly Average

Difference (BLM-BOEM)

| Max value: 5.7615E-1 at (198, 29) |
| Min value: -9.554E-01 at (191, 30) non zero cells only |
| Avg value: 2.970E-04 non zero cells only |
| Grid Total: 1.510E+01 |

![Difference Graph]

**PM2.5 Difference ugm3**

*fy2020:ag - fy2020 : 120229 : 1800*

1 Hourly Average

**Figure 5-22: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Second Highest Positive Difference)**
Third Highest Positive Difference: December 15 at 2300 hours

BLM Simulation

Max value: 4.7108E+01 at (269, 65)
Min value: 3.374E-01 at (169, 29) non zero cells only
Avg value: 1.093E+00 non zero cells only
Grid Total: 4.196E+04

Figure 5-23: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx
6.20 fy2020 Simulations (Third Highest Positive Difference)
Fourth Highest Positive Difference: February 29 at 1900 hours

BLM Simulation

Max value: 4.5008e+1 at (162, 77)
Min value: 3.432e-01 at (277,134) non zero cells only
Avg value: 1.1408e+00 non zero cells only
Grid Total: 4.3342e+04

Figure 5-24: Comparison of PM2.5 Concentrations (µg/m^3) for BLM and BOEM CAMx
6.20 fy2020 Simulations (Fourth Highest Positive Difference)
Figure 5-25: Comparison of PM$_{2.5}$ Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fifth Highest Positive Difference)
Sixth Highest Positive Difference: December 15 at 2200 hours

BLM Simulation

Max value: 4.64E+01 at (289, 65)
Min value: 3.25E-01 at (169, 23) non zero cells only
Avg value: 1.09E+00 non zero cells only
Grid Total: 4.17E+04

Difference (BLM-BOEM)

Max value: 5.00E-01 at (338, 99)
Min value: -5.14E-01 at (347, 94) non zero cells only
Avg value: 1.30E-04 non zero cells only
Grid Total: 4.36E+00

Figure 5-26: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Sixth Highest Positive Difference)
S Seventh Highest Positive Difference: February 29 at 2100 hours

BLM Simulation

Max value: 3.553E+01 at (272, 66)
Min value: 3.557E-01 at (277,126) non zero cells only
Avg value: 1.120E+00 non zero cells only
Grid Total: 4.390E+04

Figure 5-27: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Seventh Highest Positive Difference)
Eighth Highest Positive Difference: December 16 at 600 hours

BLM Simulation

Max value: 4.173E+01 at (855, 69)
Min value: 2.997E-01 at (105, 46) non zero cells only
Avg value: 1.123E+00 non zero cells only
Grid Total: 4.372E+04

Figure 5-28: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Eighth Highest Positive Difference)
Nine Highest Positive Difference: November 25 at 500 hours

BLM Simulation

Max value: 4.055E+1 at (129, 97)
Min value: 3.699E-01 at (177, 58) non zero cells only
Avg value: 1.307E+00 non zero cells only
Grid Total: 4.977E+04

Figure 5-29: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Ninth Highest Positive Difference)
Figure 5-30: Comparison of PM$_{2.5}$ Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Tenth Highest Positive Difference)
Maximum Negative Difference: November 25 at 300 hours

BLM Simulation

Max value: 4.009E+01 at (129, 87)
Min value: 3.698E-01 at (177, 55) non zero cells only
Avg value: 1.290E+00 non zero cells only
Grid Total: 4.019E+04

**Figure 5-31: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Maximum Negative Difference)**
Second Highest Negative Difference: February 29 at 1800 hours

BLM Simulation

Max value: 4.57E+01 at (162, 77)
Min value: 3.405E-01 at (277, 137) non zero cells only
Avg value: 1.144E+00 non zero cells only
Grid Total: 4.356E+04

Figure 5-32: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Second Highest Negative Difference)
Third Highest Negative Difference: November 25 at 700 hours

BLM Simulation

Max value: 4.506E+01 at (162.77)
Min value: 4.911E-01 at (179.52) non zero cells only
Avg value: 1.2098E+00 non zero cells only
Grid Total: 4.990E+04

Figure 5-33: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Third Highest Negative Difference)
Fourth Highest Negative Difference: December 16 at 100 hours

BLM Simulation

Max value: 4.685E+01 at (568, 85)
Min value: 3.332E-01 at (176, 34) non zero cells only
Avg value: 1.101E+00 non zero cells only
Grid Total: 4.194E+04

Figure 5-34: Comparison of PM$_{2.5}$ Concentrations (µg/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fourth Highest Negative Difference)
Fifth Highest Negative Difference: March 1 at 600 hours

BLM Simulation

Max value: 5.0075E+01 at (260, 69)
Min value: 3.559E-01 at (192, 75) non zero cells only
Avg value: 1.128E+00 non zero cells only
Grid Total: 4.395E+04

Difference (BLM-BOEM)

Max value: 3.559E-01 at (192, 30)
Min value: -5.881E-01 at (192, 30) non zero cells only
Avg value: -3.346E-04 non zero cells only
Grid Total: -1.274E+01

Figure 5-35: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fifth Highest Negative Difference)
Sixth Highest Negative Difference: February 29 at 2100 hours

BLM Simulation

Max value: 3.553E+01 at (272, 80)
Min value: 3.557E-01 at (277,128) non zero cells only
Avg value: 1.120E+00 non zero cells only
Grid Total: 4.296E+04

Difference (BLM-BOEM)

Max value: 5.005E-01 at (181, 26)
Min value: -5.012E-01 at (174, 91) non zero cells only
Avg value: 2.341E-04 non zero cells only
Grid Total: 1.119E+01

Figure 5-36: Comparison of PM$_{2.5}$ Concentrations (µg/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Sixth Highest Negative Difference)
Figure 5-37: Comparison of PM$_{2.5}$ Concentrations (µg/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Seventh Highest Negative Difference)
Eighth Highest Negative Difference: December 15 at 2000 hours

BLM Simulation

Max value: 4.250E+01 at (269, 65)
Min value: 3.320E-01 at (190, 35) non zero cells only
Avg value: 1.102E+00 non zero cells only
Grid Total: 4.19E+04

Figure 5-38: Comparison of PM2.5 Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Eighth Highest Negative Difference)
Ninth Highest Negative Difference: November 25 at 400 hours

BLM Simulation


difference (BLM-BOEM)

Figure 5-39: Comparison of PM$_{2.5}$ Concentrations (µg/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Ninth Highest Negative Difference)
Figure 5-40: Comparison of PM$_{2.5}$ Concentrations (µg/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Tenth Highest Negative Difference)
5.3 Sulfate

Sulfate results for the hours resulting in the 10 highest positive and negative concentration differences are presented in Table 5-3. The maximum positive difference is 0.010 µg/m³, falling to 0.008 µg/m³ for the 10th high. The maximum negative difference is -0.016 µg/m³, falling to -0.008 µg/m³ for the 10th high. The maximum positive and negative percent differences are 1.6% and -1.6%, respectively.

The top 10 positive concentration difference hours are presented in Figures 5-41 through 5-50, and the top 10 negative concentration difference hours are presented in Figures 5-51 through 5-60. No grid cells have concentration differences (rounded to two decimal places) over the |0.01| µg/m³ plotting threshold, so no locations appear on the difference plots.
Table 5-3. Comparison of fy2020 CAMx 6.20 Simulation Sulfate Concentrations (µg/m³) Run on BLM and BOEM Computer Systems. Hours with the Top 10 Maximum Positive and Maximum Negative Differences are Shown.

<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
<th>Day</th>
<th>Hour</th>
<th>BLM Conc.</th>
<th>BOEM Conc.</th>
<th>Difference (µg/m³)</th>
<th>Percent Difference</th>
<th>Column</th>
<th>Row</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>6</td>
<td>20</td>
<td>22</td>
<td>3.311</td>
<td>3.301</td>
<td>0.010</td>
<td>0.3%</td>
<td>91</td>
<td>9</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>5</td>
<td>0.669</td>
<td>0.658</td>
<td>0.010</td>
<td>1.5%</td>
<td>72</td>
<td>16</td>
</tr>
<tr>
<td>2012</td>
<td>10</td>
<td>26</td>
<td>12</td>
<td>0.961</td>
<td>0.951</td>
<td>0.009</td>
<td>1.0%</td>
<td>218</td>
<td>13</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>20</td>
<td>17</td>
<td>2.983</td>
<td>2.974</td>
<td>0.009</td>
<td>0.3%</td>
<td>84</td>
<td>29</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>7</td>
<td>8</td>
<td>0.664</td>
<td>0.655</td>
<td>0.009</td>
<td>1.4%</td>
<td>79</td>
<td>75</td>
</tr>
<tr>
<td>2012</td>
<td>7</td>
<td>20</td>
<td>11</td>
<td>2.192</td>
<td>2.184</td>
<td>0.008</td>
<td>0.4%</td>
<td>276</td>
<td>25</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>12</td>
<td>0.631</td>
<td>0.623</td>
<td>0.008</td>
<td>1.3%</td>
<td>272</td>
<td>32</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>28</td>
<td>1</td>
<td>1.797</td>
<td>1.789</td>
<td>0.008</td>
<td>0.4%</td>
<td>244</td>
<td>58</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>13</td>
<td>0.500</td>
<td>0.492</td>
<td>0.008</td>
<td>1.6%</td>
<td>105</td>
<td>20</td>
</tr>
<tr>
<td>2012</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>0.605</td>
<td>0.597</td>
<td>0.008</td>
<td>1.3%</td>
<td>74</td>
<td>5</td>
</tr>
</tbody>
</table>

Maximum Negative

<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
<th>Day</th>
<th>Hour</th>
<th>BLM Conc.</th>
<th>BOEM Conc.</th>
<th>Difference (µg/m³)</th>
<th>Percent Difference</th>
<th>Column</th>
<th>Row</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>6</td>
<td>21</td>
<td>23</td>
<td>3.476</td>
<td>3.492</td>
<td>-0.016</td>
<td>-0.5%</td>
<td>76</td>
<td>66</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>20</td>
<td>20</td>
<td>3.764</td>
<td>3.780</td>
<td>-0.016</td>
<td>-0.4%</td>
<td>74</td>
<td>28</td>
</tr>
<tr>
<td>2012</td>
<td>7</td>
<td>28</td>
<td>8</td>
<td>1.422</td>
<td>1.432</td>
<td>-0.010</td>
<td>-0.7%</td>
<td>77</td>
<td>28</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>7</td>
<td>0.664</td>
<td>0.673</td>
<td>-0.011</td>
<td>-1.6%</td>
<td>72</td>
<td>17</td>
</tr>
<tr>
<td>2012</td>
<td>3</td>
<td>11</td>
<td>5</td>
<td>0.586</td>
<td>0.594</td>
<td>-0.008</td>
<td>-1.3%</td>
<td>72</td>
<td>17</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>20</td>
<td>21</td>
<td>3.828</td>
<td>3.837</td>
<td>-0.009</td>
<td>-0.2%</td>
<td>77</td>
<td>30</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>10</td>
<td>0.573</td>
<td>0.581</td>
<td>-0.008</td>
<td>-1.4%</td>
<td>241</td>
<td>11</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>16</td>
<td>1.003</td>
<td>1.011</td>
<td>-0.008</td>
<td>-0.8%</td>
<td>103</td>
<td>50</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>3</td>
<td>0.576</td>
<td>0.584</td>
<td>-0.008</td>
<td>-1.4%</td>
<td>96</td>
<td>9</td>
</tr>
</tbody>
</table>
**Figure 5-41: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Maximum Positive Difference)**
Figure 5-42: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Second Highest Positive Difference)
Third Highest Positive Difference: October 26 at 1200 hours

BLM Simulation

Figure 5-43: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Third Highest Positive Difference)
Fourth Highest Positive Difference: June 20 at 1700 hours

BLM Simulation

Max value: 1.089E+00 at (122, 96)
Min value: 1.988E+00 at (272, 59) non zero cells only
Avg value: 2.988E+00 non zero cells only
Grid Total: 1.198E+00

Figure 5-44: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fourth Highest Positive Difference)
Fifth Highest Positive Difference: February 7 at 800 hours

BLM Simulation

Figure 5-45: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fifth Highest Positive Difference)
Sixth Highest Positive Difference: July 20 at 1100 hours

BLM Simulation

Max value: 3.723E+90 at (181, 74)
Min value: 3.976E-01 at (237, 44) non zero cells only
Avg value: 1.051E+00 non zero cells only
Grid Total: 4.965E+04

**Figure 5-46: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Sixth Highest Positive Difference)**
Seventh Highest Positive Difference: February 29 at 1200 hours

BLM Simulation

Max value: \(2.138E+90\) at (162, 77)
Min value: \(1.584E-01\) at (151, 57) non zero cells only
Avg value: \(2.007E-01\) non zero cells only
Grid Total: \(1.170E+04\)

Figure 5-47: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Seventh Highest Positive Difference)

Difference (BLM-BOEM)

Max value: \(8.210E-03\) at (372, 32)
Min value: \(-6.091E-03\) at (357, 15) non zero cells only
Avg value: \(-1.421E-06\) non zero cells only
Grid Total: \(-5.310E-02\)

Figure 5-47: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Seventh Highest Positive Difference)
Eighth Highest Positive Difference: June 28 at 100 hours

BLM Simulation

Max value: 7.25B+90 at (206, 70)
Min value: 1.86B-01 at (370, 39) non zero cells only
Avg value: 2.46B+00 non zero cells only
Grid Total: 9.30B+04

Difference (BLM-BOEM)

Max value: 8.06B-03 at (244, 56)
Min value: -8.41E-04 at (244, 59) non zero cells only
Avg value: 4.52E-07 non zero cells only
Grid Total: 1.31E-02

Figure 5-48: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx
6.20 fy2020 Simulations (Eighth Highest Positive Difference)
Ninth Highest Positive Difference: February 29 at 1300 hours

BLM Simulation

Max value: 2.34E+09 at (162, 77)
Min value: 1.50E+01 at (155, 58) non zero cells only
Avg value: 2.60E+01 non zero cells only
Grid Total: 1.16E+04

Difference (BLM-BOEM)

Max value: 8.04E-23 at (55, 20)
Min value: -5.56E-03 at (255, 20) non zero cells only
Avg value: -2.79E-06 non zero cells only
Grid Total: -1.05E-01

Figure 5-49: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Ninth Highest Positive Difference)
Figure 5-50: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Tenth Highest Positive Difference)
Maximum Negative Difference: June 21 at 2300 hours

BLM Simulation

Max value: 6.97E+00 at (180, 80)
Min value: 2.17E-01 at (4139) non zero cells only
Avg value: 3.52E+00 non zero cells only
Grid Total: 1.34E+05

Figure 5-51: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx
6.20 fy2020 Simulations (Maximum Negative Difference)
Figure 5-52: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Second Highest Negative Difference)
Third Highest Negative Difference: February 29 at 800 hours

BLM Simulation

Max value: 2.119E+90 at (162, 77)
Min value: 1.5688E-01 at (175, 64) non zero cells only
Avg value: 3.048E-01 non zero cells only
Grid Total: 1.101E+04

Difference (BLM-BOEM)

Max value: 8.624E-06 at (557, 35)
Min value: -1.097E-02 at (72, 17) non zero cells only
Avg value: -4.446E-07 non zero cells only
Grid Total: -1.539E-02

Figure 5-53: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Third Highest Negative Difference)
Figure 5-54: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fourth Highest Negative Difference)
Figure 5-55: Comparison of Sulfate Concentrations ($\mu$g/m$^3$) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fifth Highest Negative Difference)
Figure 5-56: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Sixth Highest Negative Difference)
Seventh Highest Negative Difference: February 29 at 1100 hours

BLM Simulation

Max value: 2.157E+09 at (162, 77)
Min value: 1.592E-01 at (151, 57) non zero cells only
Avg value: 3.094E-01 non zero cells only
Grid Total: 1.179E+04

Figure 5-57: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Seventh Highest Negative Difference)
Eighth Highest Negative Difference: February 29 at 1000 hours

BLM Simulation

Max value: 2.23E+00 at (162, 77)
Min value: 1.59E-01 at (151, 57) non zero cells only
Avg value: 3.079E-01 non zero cells only
Grid Total: 1.172E+04

Figure 5-58: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Eighth Highest Negative Difference)
Ninth Highest Negative Difference: October 20 at 1600 hours

BLM Simulation

Figure 5-59: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx
6.20 fy2020 Simulations (Ninth Highest Negative Difference)
Tenth Highest Negative Difference: February 29 at 300 hours

BLM Simulation

Figure 5-60: Comparison of Sulfate Concentrations (µg/m³) for BLM and BOEM CAMx
6.20 fy2020 Simulations (Tenth Highest Negative Difference)
5.4 Nitrate

Nitrate results for the hours resulting in the 10 highest positive and negative concentration differences are presented in Table 5-4. The maximum positive difference is 0.606 µg/m³, falling to 0.464 µg/m³ for the 10th high. The maximum negative difference is -1.308 µg/m³, falling to -0.571 µg/m³ for the 10th high. The maximum positive and negative percent differences are 87.3% and -1369%, respectively, both on low nitrate concentration days.

The top 10 positive concentration difference hours are presented in Figures 5-61 through 5-70, and the top 10 negative concentration difference hours are presented in Figures 5-71 through 5-80. As was discussed in Section 5.2 for the PM$_{2.5}$ concentrations, the differences occur in a pattern of scattered positive and negative differences either offshore or over the Brooks Range.

We speculate that the differences are most likely from different pathways being taken in the ISORROPIA algorithm.
Table 5-4. Comparison of fy2020 CAMx 6.20 Simulation Nitrate Concentrations (µg/m³) Run on BLM and BOEM Computer Systems. Hours with the Top 10 Maximum Positive and Maximum Negative Differences are Shown.

<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
<th>Day</th>
<th>Hour</th>
<th>BLM Conc.</th>
<th>BOEM Conc.</th>
<th>Difference (µg/m³)</th>
<th>Percent Difference</th>
<th>Column</th>
<th>Row</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Maximum Positive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>12</td>
<td>15</td>
<td>19</td>
<td>0.742</td>
<td>0.136</td>
<td>0.606</td>
<td>81.7%</td>
<td>231</td>
<td>103</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>18</td>
<td>0.977</td>
<td>0.394</td>
<td>0.583</td>
<td>59.7%</td>
<td>198</td>
<td>29</td>
</tr>
<tr>
<td>2012</td>
<td>12</td>
<td>15</td>
<td>23</td>
<td>0.658</td>
<td>0.084</td>
<td>0.574</td>
<td>87.3%</td>
<td>244</td>
<td>94</td>
</tr>
<tr>
<td>2012</td>
<td>12</td>
<td>16</td>
<td>1</td>
<td>0.698</td>
<td>0.160</td>
<td>0.538</td>
<td>77.1%</td>
<td>237</td>
<td>102</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>19</td>
<td>1.000</td>
<td>0.466</td>
<td>0.534</td>
<td>53.4%</td>
<td>177</td>
<td>21</td>
</tr>
<tr>
<td>2012</td>
<td>12</td>
<td>15</td>
<td>22</td>
<td>0.639</td>
<td>0.107</td>
<td>0.532</td>
<td>83.3%</td>
<td>238</td>
<td>99</td>
</tr>
<tr>
<td>2012</td>
<td>12</td>
<td>16</td>
<td>6</td>
<td>0.625</td>
<td>0.107</td>
<td>0.517</td>
<td>82.8%</td>
<td>230</td>
<td>105</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>21</td>
<td>0.676</td>
<td>0.184</td>
<td>0.492</td>
<td>72.7%</td>
<td>181</td>
<td>26</td>
</tr>
<tr>
<td>2012</td>
<td>11</td>
<td>25</td>
<td>0</td>
<td>1.163</td>
<td>0.678</td>
<td>0.485</td>
<td>41.7%</td>
<td>76</td>
<td>100</td>
</tr>
<tr>
<td>2012</td>
<td>12</td>
<td>16</td>
<td>12</td>
<td>0.633</td>
<td>0.169</td>
<td>0.464</td>
<td>73.3%</td>
<td>212</td>
<td>124</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Maximum Negative</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>11</td>
<td>25</td>
<td>3</td>
<td>0.985</td>
<td>2.293</td>
<td>-1.308</td>
<td>-132.8%</td>
<td>69</td>
<td>101</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>18</td>
<td>0.427</td>
<td>1.294</td>
<td>-0.867</td>
<td>-203.0%</td>
<td>191</td>
<td>30</td>
</tr>
<tr>
<td>2012</td>
<td>11</td>
<td>25</td>
<td>7</td>
<td>1.126</td>
<td>1.878</td>
<td>-0.752</td>
<td>-66.8%</td>
<td>72</td>
<td>110</td>
</tr>
<tr>
<td>2012</td>
<td>12</td>
<td>16</td>
<td>1</td>
<td>0.144</td>
<td>0.768</td>
<td>-0.624</td>
<td>-433.1%</td>
<td>226</td>
<td>114</td>
</tr>
<tr>
<td>2012</td>
<td>11</td>
<td>25</td>
<td>4</td>
<td>0.886</td>
<td>1.478</td>
<td>-0.592</td>
<td>-66.8%</td>
<td>69</td>
<td>107</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>29</td>
<td>21</td>
<td>0.450</td>
<td>1.040</td>
<td>-0.590</td>
<td>-131.3%</td>
<td>174</td>
<td>31</td>
</tr>
<tr>
<td>2012</td>
<td>11</td>
<td>24</td>
<td>23</td>
<td>1.174</td>
<td>1.759</td>
<td>-0.586</td>
<td>-49.9%</td>
<td>75</td>
<td>93</td>
</tr>
<tr>
<td>2012</td>
<td>3</td>
<td>1</td>
<td>6</td>
<td>0.260</td>
<td>0.842</td>
<td>-0.582</td>
<td>-223.6%</td>
<td>152</td>
<td>20</td>
</tr>
<tr>
<td>2012</td>
<td>12</td>
<td>15</td>
<td>20</td>
<td>0.042</td>
<td>0.614</td>
<td>-0.572</td>
<td>-1368.6%</td>
<td>239</td>
<td>104</td>
</tr>
<tr>
<td>2012</td>
<td>12</td>
<td>15</td>
<td>14</td>
<td>0.117</td>
<td>0.688</td>
<td>-0.571</td>
<td>-490.2%</td>
<td>232</td>
<td>96</td>
</tr>
</tbody>
</table>
Maximum Positive Difference: December 15 at 1900 hours

BLM Simulation

Max value: 1.64E+90 at (266, 75)
Min value: 1.73E-09 at (44,132) non zero cells only
Avg value: 2.21E-01 non zero cells only
Grid Total: 6.41E+00

Figure 5-61: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx
6.20 fy2020 Simulations (Maximum Positive Difference)
Figure 5-62: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Second Highest Positive Difference)
**Third Highest Positive Difference: December 15 at 2300 hours**

**BLM Simulation**

Max value: 2.59E+00 at (273, 69)
Min value: 1.90E-03 at (169, 20) non zero cells only
Avg value: 2.39E-01 non zero cells only
Grid Total: 6.739E+03

**Figure 5-63: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Third Highest Positive Difference)**
Fourth Highest Positive Difference: December 16 at 100 hours

BLM Simulation

Max value: 2.2108E+00 at (272.66)
Min value: 1.976E-05 at (176.34) non zero cells only
Avg value: 2.367E-01 non zero cells only
Grid Total: 9.099E+03

Figure 5-64: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fourth Highest Positive Difference)
Fifth Highest Positive Difference: February 29 at 1900 hours

BLM Simulation

Max value: 1.316E+00 at (34, 24)
Min value: 5.584E-05 at (274, 13) non zero cells only
Avg value: 3.635E-01 non zero cells only
Grid Total: 1.976E+04

Figure 5-65: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fifth Highest Positive Difference)
Sixth Highest Positive Difference: December 15 at 2200 hours

BLM Simulation

Max value: 1.849E+05 at (373, 30)
Min value: 1.991E-03 at (170, 23) non zero cells only
Avg value: 2.384E-01 non zero cells only
Grid Total: 6.664E+03

Figure 5-66: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx

6.20 fy2020 Simulations (Sixth Highest Positive Difference)
Seventh Highest Positive Difference: December 16 at 600 hours

BLM Simulation

Max value: 2.532E+00 at (266, 72)
Min value: 1.916E-03 at (106, 46) non zero cells only
Avg value: 2.477E-01 non zero cells only
Grid Total: 9.454E+03

Figure 5-67: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Seventh Highest Positive Difference)
Eighth Highest Positive Difference: February 29 at 2100 hours

BLM Simulation

Max value: 1.266E+00 at (267, 61)
Min value: 5.668E-02 at (276,196) non zero cells only
Avg value: 2.769E-01 non zero cells only
Grid Total: 1.947E+04

Figure 5-68: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Eighth Highest Positive Difference)
Ninth Highest Positive Difference: November 25 at 0 hours

BLM Simulation

Max value: 5.559E+00 at (92, 97)
Min value: 2.552E-03 at (277, 130) non zero cells only
Avg value: 1.762E-01 non zero cells only
Grid Total: 6.440E+03

Figure 5-69: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Ninth Highest Positive Difference)
Tenth Highest Positive Difference: December 16 at 1200 hours

BLM Simulation

Max value: 2.343E+00 at (256.75)
Min value: 3.592E-03 at (212.56) non zero cells only
Avg value: 2.401E-01 non zero cells only
Grid Total: 9.144E+03

Figure 5-70: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Tenth Highest Positive Difference)
Figure 5-71: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Maximum Negative Difference)
Figure 5-72: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Second Highest Negative Difference)
Figure 5-73: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Third Highest Negative Difference)
Fourth Highest Negative Difference: December 16 at 100 hours
BLM Simulation

Max value: 2.210E+00 at (372, 661)
Min value: 1.976E-03 at (176, 34) non zero cells only
Avg value: 2.287E-01 non zero cells only
Grid Total: 9.091E+03

Figure 5-74: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fourth Highest Negative Difference)
Fifth Highest Negative Difference: November 25 at 400 hours

BLM Simulation

Max value: 5.337E+00 at (87.93)
Min value: 2.388E-03 at (277.138) non zero cells only
Avg value: 1.669E-01 non zero cells only
Grid Total: 6.438E+03

Figure 5-75: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx
6.20 fy2020 Simulations (Fifth Highest Negative Difference)
Sixth Highest Negative Difference: February 29 at 2100 hours

BLM Simulation

Max value: 1.266E+00 at (227, 61)
Min value: 5.668E-03 at (276, 196) non zero cells only
Avg value: 2.560E-01 non zero cells only
Grid Total: 1.047E+04

Figure 5-76: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Sixth Highest Negative Difference)
Seventh Highest Negative Difference: November 24 at 2300 hours

BLM Simulation

Max value: 5.678E+00 at (93, 97)
Min value: 2.625E-03 at (377, 139) non zero cells only
Avg value: 1.767E-01 non zero cells only
Grid Total: 6.692E+05

Figure 5-77: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Seventh Highest Negative Difference)
Eighth Highest Negative Difference: March 1 at 600 hours

BLM Simulation

Figure 5-78: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Eighth Highest Negative Difference)
Ninth Highest Negative Difference: December 15 at 2000 hours
BLM Simulation

Max value: 1.748E+00 at (209, 74)
Min value: 1.706E-03 at (50, 137) non zero cells only
Avg value: 2.238E-01 non zero cells only
Grid Total: 8.446E+05

PN03 Conc.
1 Hourly Average

Difference (BLM-BOEM)

Max value: 4.539E+00 at (294, 113)
Min value: -5.775E-01 at (239, 104) non zero cells only
Avg value: -4.560E-06 non zero cells only
Grid Total: -1.710E-01

PN03 Difference ug/m3
1 Hourly Average

Figure 5-79: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Ninth Highest Negative Difference)
Figure 5-80: Comparison of Nitrate Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Tenth Highest Negative Difference)
5.5 Organic Carbon (OC)

Organic Carbon (OC) results for the hours resulting in the 10 highest positive and negative concentration differences are presented in Table 5-5. The differences are small. The positive differences for the 1st to 10th high is 0.002 µg/m^3. The maximum negative difference is -0.004 µg/m^3, falling to -0.002 µg/m^3 for the 10th high. The maximum positive and negative percent differences are 1.0% and -0.8%, respectively.

The top 10 positive concentration difference hours are presented in Figures 5-81 through 5-90, and the top 10 negative concentration difference hours are presented in Figures 5-91 through 5-100. No differences are over the |0.01| µg/m^3 plotting threshold, so none appear on the difference plots.
Table 5-5. Comparison of fy2020 CAMx 6.20 Simulation Organic Carbon Concentrations (µg/m³) Run on BLM and BOEM Computer Systems. Hours with the Top 10 Maximum Positive and Maximum Negative Differences are Shown.

<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
<th>Day</th>
<th>Hour</th>
<th>BLM Conc.</th>
<th>BOEM Conc.</th>
<th>Difference (µg/m³)</th>
<th>Percent Difference</th>
<th>Column</th>
<th>Row</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maximum Positive</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>18</td>
<td>17</td>
<td>1.927</td>
<td>1.925</td>
<td>0.002</td>
<td>0.1%</td>
<td>156</td>
<td>44</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>18</td>
<td>20</td>
<td>1.908</td>
<td>1.906</td>
<td>0.002</td>
<td>0.1%</td>
<td>173</td>
<td>39</td>
</tr>
<tr>
<td>2012</td>
<td>8</td>
<td>13</td>
<td>1</td>
<td>0.383</td>
<td>0.380</td>
<td>0.002</td>
<td>0.6%</td>
<td>152</td>
<td>38</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>18</td>
<td>21</td>
<td>1.148</td>
<td>1.146</td>
<td>0.002</td>
<td>0.2%</td>
<td>198</td>
<td>42</td>
</tr>
<tr>
<td>2012</td>
<td>8</td>
<td>19</td>
<td>18</td>
<td>1.900</td>
<td>1.898</td>
<td>0.002</td>
<td>0.1%</td>
<td>265</td>
<td>46</td>
</tr>
<tr>
<td>2012</td>
<td>8</td>
<td>19</td>
<td>16</td>
<td>1.184</td>
<td>1.182</td>
<td>0.002</td>
<td>0.2%</td>
<td>244</td>
<td>25</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>27</td>
<td>8</td>
<td>0.196</td>
<td>0.195</td>
<td>0.002</td>
<td>1.0%</td>
<td>173</td>
<td>64</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>18</td>
<td>19</td>
<td>2.563</td>
<td>2.561</td>
<td>0.002</td>
<td>0.1%</td>
<td>172</td>
<td>38</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>28</td>
<td>1</td>
<td>0.462</td>
<td>0.460</td>
<td>0.002</td>
<td>0.4%</td>
<td>244</td>
<td>58</td>
</tr>
<tr>
<td>2012</td>
<td>1</td>
<td>26</td>
<td>23</td>
<td>1.041</td>
<td>1.039</td>
<td>0.002</td>
<td>0.1%</td>
<td>52</td>
<td>96</td>
</tr>
<tr>
<td><strong>Maximum Negative</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>7</td>
<td>12</td>
<td>18</td>
<td>2.087</td>
<td>2.091</td>
<td>-0.004</td>
<td>-0.2%</td>
<td>63</td>
<td>2</td>
</tr>
<tr>
<td>2012</td>
<td>8</td>
<td>24</td>
<td>7</td>
<td>0.846</td>
<td>0.849</td>
<td>-0.003</td>
<td>-0.4%</td>
<td>162</td>
<td>56</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>23</td>
<td>8</td>
<td>1.466</td>
<td>1.468</td>
<td>-0.003</td>
<td>-0.2%</td>
<td>187</td>
<td>9</td>
</tr>
<tr>
<td>2012</td>
<td>8</td>
<td>23</td>
<td>20</td>
<td>1.104</td>
<td>1.106</td>
<td>-0.003</td>
<td>-0.2%</td>
<td>125</td>
<td>19</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>4</td>
<td>14</td>
<td>8.151</td>
<td>8.153</td>
<td>-0.002</td>
<td>0.0%</td>
<td>94</td>
<td>82</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>23</td>
<td>9</td>
<td>1.324</td>
<td>1.326</td>
<td>-0.002</td>
<td>-0.2%</td>
<td>188</td>
<td>12</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>19</td>
<td>2</td>
<td>3.361</td>
<td>3.363</td>
<td>-0.002</td>
<td>-0.1%</td>
<td>140</td>
<td>40</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>27</td>
<td>11</td>
<td>0.913</td>
<td>0.915</td>
<td>-0.002</td>
<td>-0.2%</td>
<td>93</td>
<td>78</td>
</tr>
<tr>
<td>2012</td>
<td>2</td>
<td>26</td>
<td>10</td>
<td>0.242</td>
<td>0.244</td>
<td>-0.002</td>
<td>-0.8%</td>
<td>181</td>
<td>67</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>23</td>
<td>10</td>
<td>1.179</td>
<td>1.181</td>
<td>-0.002</td>
<td>-0.1%</td>
<td>190</td>
<td>14</td>
</tr>
</tbody>
</table>
Maximum Positive Difference: June 18 at 1700 hours

BLM Simulation

Max value: 2.7628+01 at (134, 39)
Min value: 9.519E-03 at (245,120) non zero cells only
Avg value: 1.119E-01 non zero cells only
Grid Total: 4.202E+03

Figure 5-81: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Maximum Positive Difference)
Second Highest Positive Difference: June 18 at 2000 hours

BLM Simulation

Max value: 1.923E+01 at (134, 39)
Min value: 8.892E-03 at (4, 2) non zero cells only
Avg value: 1.371E-01 non zero cells only
Grid Total: 4.860E+03

Difference (BLM-BOEM)

Max value: 2.287E-03 at (173, 39)
Min value: -1.002E-03 at (173, 44) non zero cells only
Avg value: 2.668E-07 non zero cells only
Grid Total: 8.888E-03

Figure 5-82: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Second Highest Positive Difference)
Figure 5-83: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Third Highest Positive Difference)
Fourth Highest Positive Difference: June 18 at 2100 hours

BLM Simulation

Max value: 2.19E+01 at (134, 39)
Min value: 6.55E-03 at (4, 2) non zero cells only
Avg value: 1.32E-01 non zero cells only
Grid Total: 5.03E+03

OC Conc.
fy2020.ag : 120618 : 2100 AKST
1 Hourly Average

Difference (BLM-BOEM)

Max value: 2.09E-03 at (198, 42)
Min value: -5.50E-04 at (146, 90) non zero cells only
Avg value: 2.34E-07 non zero cells only
Grid Total: 1.07E-02

OC Difference ug/m3
1 Hourly Average

Figure 5-84: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fourth Highest Positive Difference)
Figure 5-85: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fifth Highest Positive Difference)
Figure 5-86: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Sixth Highest Positive Difference)
Seventh Highest Positive Difference: February 27 at 800 hours

BLM Simulation

Max value: 4.007E+00 at (94, 82)
Min value: 6.972E-03 at (7, 70) non zero cells only
Avg value: 3.129E-02 non zero cells only
Grid Total: 1.192E+03

![Diagram of OC Conc.](image1)

Figure 5-87: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Seventh Highest Positive Difference)

Difference (BLM-BOEM)

Max value: 1.904E-03 at (173, 64)
Min value: -3.056E-04 at (177, 49) non zero cells only
Avg value: 1.348E-05 non zero cells only
Grid Total: 4.933E-04

![Diagram of OC Difference](image2)
Figure 5-88: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Eighth Highest Positive Difference)
Figure 5-89: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Ninth Highest Positive Difference)
Figure 5-90: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Tenth Highest Positive Difference)
Figure 5-91: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Maximum Negative Difference)
Second Highest Negative Difference: August 24 at 700 hours

BLM Simulation

- Max value: 8.92E+90 at (122.90)
- Min value: 4.757E-03 at (377.132) non zero cells only
- Avg value: 2.127E-01 non zero cells only
- Grid Total: 6.114E+03

Figure 5-92: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Second Highest Negative Difference)
Third Highest Negative Difference: June 23 at 800 hours

BLM Simulation

Max value: 1.02E+01 at (122, 06)
Min value: 1.474E-03 at (65,130) non zero cells only
Avg value: 1.121E-01 non zero cells only
Grid Total: 4.360E+03

Figure 5-93: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Third Highest Negative Difference)
Fourth Highest Negative Difference: August 23 at 2000 hours

BLM Simulation

Max value: 6.89E+09 at (122, 90)
Min value: 1.97E-05 at (277,130) non zero cells only
Avg value: 2.05E-01 non zero cells only
Grid Total: 7.75E+03

Figure 5-94: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fourth Highest Negative Difference)
Figure 5-95: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Fifth Highest Negative Difference)
Sixth Highest Negative Difference: June 23 at 900 hours

BLM Simulation

Max value: 1.099E+91 at (122, 90)
Min value: 1.693E+03 at (66, 190) non zero cells only
Avg value: 1.109E+01 non zero cells only
Grid Total: 4.213E+03

OC Conc.
fy2020.ag : 120623 : 0900 AKST
1 Hourly Average

Difference (BLM-BOEM)

Max value: 4.731E-04 at (18, 3)
Min value: -2.954E-03 at (189, 15) non zero cells only
Avg value: -4.598E-06 non zero cells only
Grid Total: -1.499E-01

OC Difference ugm3
1 Hourly Average

Figure 5-96: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Sixth Highest Negative Difference)
Seventh Highest Negative Difference: June 19 at 200 hours

BLM Simulation

Max value: 3.934E+90 at (136, 39)
Min value: 7.346E-03 at (34, 2) non zero cells only
Avg value: 9.444E-02 non zero cells only
Grid Total: 3.597E+06

Figure 5-97: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Seventh Highest Negative Difference)
Eighth Highest Negative Difference: February 27 at 1100 hours

BLM Simulation

Figure 5-98: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Eighth Highest Negative Difference)
Figure 5-99: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Ninth Highest Negative Difference)
Figure 5-100: Comparison of Organic Carbon Concentrations (µg/m³) for BLM and BOEM CAMx 6.20 fy2020 Simulations (Tenth Highest Negative Difference)
6.0 CONCLUSION

A comparison has been made between base and future year CAMx 6.20 simulations performed on the BOEM computer and simulations using the same input files and configuration performed on the Alpine Geophysics computer system for the BLM NS-RAQM project. The comparisons were conducted for ozone, PM$_{2.5}$, sulfate, nitrate and organic carbon and included an examination of hourly gridded concentrations.

The hourly gridded comparison showed limited areas of concentration differences, with the location, date and time of the largest differences being similar for both the base and future year simulations, although the magnitude of the concentration differences are slightly different. The ozone, sulfate and organic carbon concentrations showed small differences.

For nitrate, which dominated the difference in the PM$_{2.5}$ concentrations, the concentration differences tended to be offshore or in the Brooks Range. The regions of concentration difference showed positive differences located very near negative differences. The sum of the differences showed very small differences in the model predictions over the entire modeling domain. These concentration differences are most likely a result of different pathways being taken in the ISORROPIA algorithm.