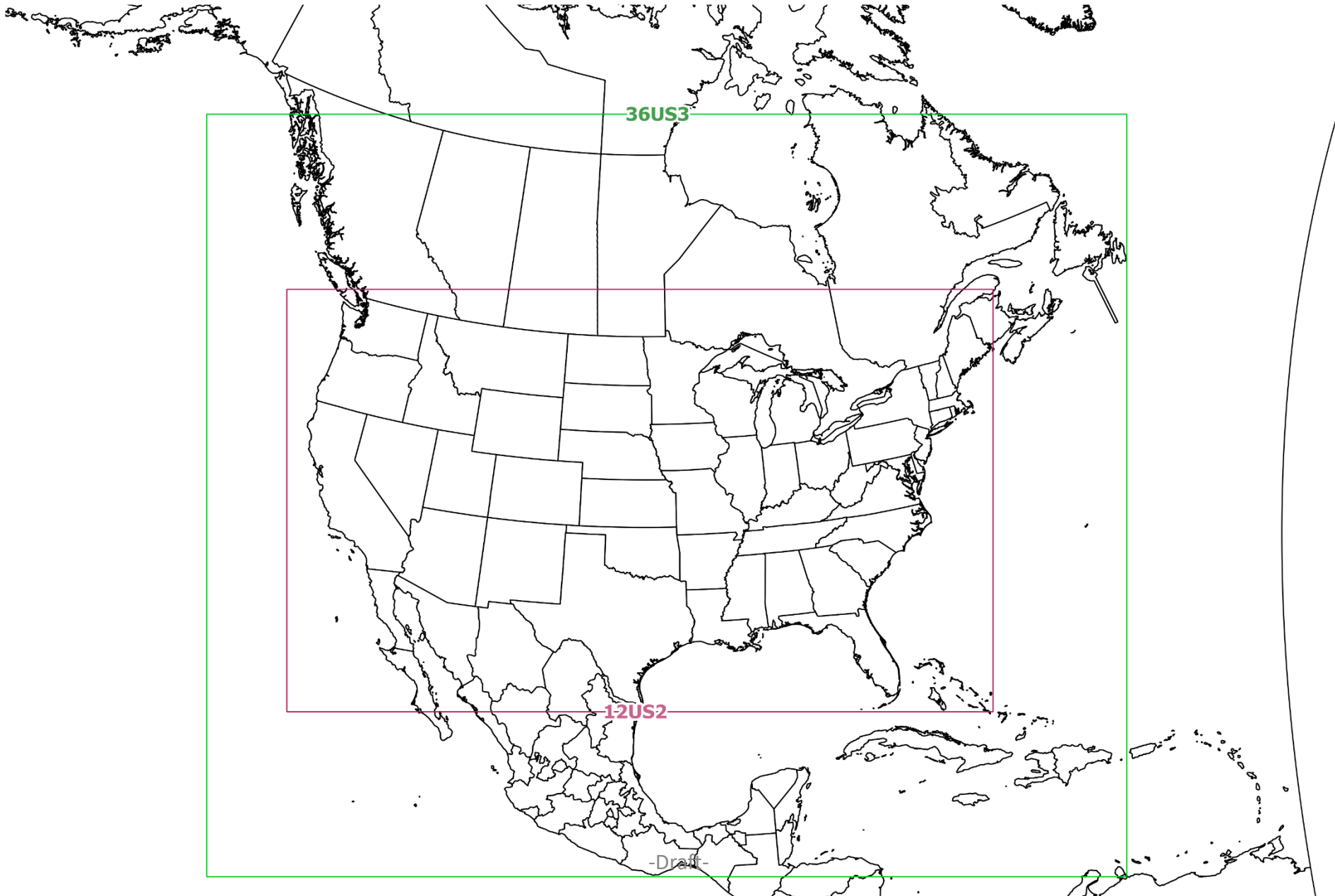


2016 beta Model Simulations

AQ Modeling Inputs and Set-up

| component | Details | Reference |
|-----------------------------|---|--|
| Emissions case | 2016 beta (2016ff) | http://views.cira.colostate.edu/wiki/wiki/9169 |
| Meteorology | WRF v3.8; | http://views.cira.colostate.edu/wiki/Attachments/Inventory%20Collaborative/Documentation/2016beta_0311/MET_TSD_2016.pdf |
| Meteorology post-processing | wrfcamx; MCIP v4.3 ("16j") | http://www.camx.com/files/camxusersguide_v6-50.pdf ; https://www.geosci-model-dev.net/3/243/2010/gmd-3-243-2010-discussion.html |
| IC/BC | 2016fe hemispheric CMAQv5.2.1 paired with CMAQ/CAMx 36US3 CONUS | https://cmascen.org/conference//2018/slides/0850_henderson_hemispheric-cmaq_application_2018.pptx |
| Model (chemical mechanism) | CAMx v6.5 (cb6r4_CF); CMAQv5.2.1 (cb6r3/AERO6 nvPOA) | http://www.camx.com/ ; https://www.epa.gov/cmaq/cmaq-models-0 |
| domains | 36US3 & 12US2 CONUS | See next slide |
| Layers | 35 vertical layers (no layer collapsing) | |

Model Domains



WRF Set-Up

| | |
|--|---|
| Model Version | v3.8 |
| Physics Options | Pleim-Xiu land surface model; ACM v2 boundary layer scheme; Kain-Fritsch; cumulus parameterization with moisture-advection trigger; Morrison double moment microphysics; RRTMG longwave and shortwave radiation schemes; |
| 36 NOAM domain Initialization | 0.25-degree GFS analysis and 3-hour forecast from 00Z, 06Z, 12Z, 18Z |
| 12 US domain Initialization | 12 km NAM; 40 km EDAS where NAM data were not available |
| Analysis Nudging | temperature, wind, and moisture above the boundary layer |
| Deep soil moisture initialization | ipxwrf program |
| Landuse and land cover | 36 NOAM domain: USGS; 12 US domain: 2011 NLCD |
| Sea surface temperatures | GHRSSST at 1 km resolution |
| Other | Lightning data assimilation for characterizing deep convection |

MCIP Set-Up

| Namelist Options | 2016 36US3 MCIP settings | 2016 12US2 MCIP settings |
|------------------|--------------------------|--------------------------|
| USERDEFS | | |
| lpv | 1 | 1 |
| lwout | 1 | 1 |
| luvcout | 1 | 1 |
| lsat | 0 | 0 |
| intvl | 60 | 60 |
| coordnam | 36NOAM | 12CONUS |
| grdnam | 36US3 | 12US2 |
| ctmlays | -1.0 | -1.0 |
| btrim | 5 | -1 |
| lpvt_col | 0 | 0 |
| lpvt_row | 0 | 0 |
| wrf_lc_ref_lat | 40.0 | 40.0 |
| WINDOWDEFS | | |
| x0 | 0 | 18 |
| y0 | 0 | 15 |
| ncolsin | 0 | 396 |
| nrowsin | 0 | 246 |

WRFCAMx Set-Up

| Namelist Options | 2016 wrfcamx |
|--------------------|--------------|
| Diagnostic Fields | T |
| KV Method | ALL |
| Minimum Kv | 0.1 |
| Project | LAMBERT |
| Subgrid convection | DIAG |
| Subgrid stratiform | T |
| WRF output freq | 60. |
| Grid time zone | 0 |

Note: kvpatch was applied to the YSU vertical diffusivity files to apply landuse dependent minimum Kvs with the lowest 200 meters above the surface.

CMAQv5.2.1 Science Options

| | |
|-------------------------------|-----------------------|
| CTM_WB_DUST [default: Y] | N (36US3) / Y (12US2) |
| CTM_ERODE_AGLAND [default: Y] | N (36US3) / Y (12US2) |
| CTM_LTNG_NO [default: Y] | N |
| CTM_WVEL [default: Y] | N |
| KZMIN [default: Y] | Y |
| CTM_ILDEPV [default: Y] | Y |
| CTM_MOSAIC [default: N] | N |
| CTM_FST [default: N] | N |
| CTM_HGBIDI [default: N] | N |
| CTM_ABFLUX [default: Y] | N |
| CTM_SFC_HONO [default: Y] | Y |
| CTM_GRAV_SETL [default: Y] | Y |
| CTM_BIOGEMIS [default: Y] | N |
| CTM_PT3DEMIS [default: Y] | Y |
| CTM_ZERO_PCSEA [default: N] | N |

CAMxv6.50 Science Options

| | |
|-------------------------------|---------|
| Diagnostic_Error_Check | FALSE |
| Flexi_Nest | FALSE |
| Advection_Solver | PPM |
| Chemistry_Solver | EBI |
| PiG_Submodel | NONE |
| Probing_Tool | RTRAC |
| Chemistry | TRUE |
| Drydep_Model | ZHANG03 |
| Wet_Deposition | TRUE |
| ACM2_Diffusion | FALSE |
| Surface_Model | FALSE |
| Inline_Ix_Emissions | TRUE |
| Super_Stepping | TRUE |
| Gridded_Emissions | TRUE |
| Point_Emissions | TRUE |