1. Dust storm dataset (dust dataset)

The dust storm dataset is produced from a regional climate model WRF-NMM (WRF: Weather Research and Forecasting, NMM: Nonhydrostatic Mesoscale Model; Huang et al. 2013). It is about 390M in size. The “dust” dataset contains the information of dust dry deposition load (*μg*/*m*2), dust wet deposition (*μg*/*m*2), total dust load (*μg*/*m*2), and surface dust concentration of PM10 aerosols (*μg*/*m*3) at four dimensions: latitude, longitude, time, and pressure. Scientists can exploit our remote visualization system to interactively examine the spatiotemporal variations of dust load at different pressure levels.

Table 1. Dust storm dataset description

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Latitude | Longitude | Temporal | Pressure Level | Attribute |
| Dimension | 88 | 120 | 24 | 8 | dust dry deposition, dust web deposition, surface dust concentration, total dust load |
| Resolution | 0.3 degree | 0.3 degree | 3 hours |
| Start | 23.0 | -128 | 07/04/2007 |
| End | 49.1 | -92.3 | 07/07/2007 |

1. Atmospheric flow dataset (“flow” dataset).

The atmospheric flow dataset is generated by the Dust REgional Atmospheric Model (DREAM) (Nickovic et al. 2001). The dataset was a result of a 72-hour dust condition simulation, from July 1st to July 4th, 2014. The simulation area is located in the Southwestern United States with a resolution of 0.027 degree (about 33km). The “flow” dataset contains the information of atmospheric conditions (e.g. precipitation, wind speed and direction), land surface conditions (e.g. soil moisture and temperature), and dust conditions (e.g. dust concentration, dust load).

Table 2. Atmospheric flow dataset description

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Latitude | Longitude | Temporal | Pressure Level | Attribute |
| Dimension | 155 | 152 | 24 | 24 | Wind speed, wind direction, precipitation, soil moisture, soil temperature, dust concentration, dust load |
| Resolution | 0.027 degree | 0.027 degree | 3 hours |
| Start | 33.1 | -116.4 | 07/01/2014 |
| End | 35.3 | -112.4 | 07/04/2014 |

References

Huang Q., Yang C., Benedict K., Rezgui A., Xie J., Xia J., and Chen, S. 2013. Using Adaptively Coupled Models and High-performance Computing for Enabling the Computability of Dust Storm Forecasting. *International Journal of Geographic Information Science* 27(4): 765–784.

Nickovic, S., Papadopoulos, A., Kakaliagou, O., and Kallos, G. 2001. Model for Prediction of Desert Dust Cycle in the Atmosphere. [*Journal of Geophysical Research Atmospheres*](http://www.researchgate.net/journal/0148-0227_Journal_of_Geophysical_Research_Atmospheres) 106: 18113-18129.