Introduction

Wind energy cost models incur inaccuracies from uncertainty in ambient wind measurements and estimates. This inhibits the best possible investment in wind energy infrastructure and management systems. High-resolution temporal and spatial wind data needed for wind availability analysis—usually created with regional-scale models—have traditionally been proprietary and costly to obtain. Freely available global model data suffers from either lower spatial or temporal resolution, or both. Low spatial resolution fails to realistically represent wind speeds in complex terrain. Low temporal resolution fails to capture the full diurnal cycle of wind behavior.

The NCAR Global Climate Four-Dimensional Data Assimilation (CFDDA) Hourly 40 km Reanalysis was developed in 2009-2010 by the Research Applications Laboratory (RAL) to provide the most accurate boundary layer wind estimates available at that time. The dataset spans 21 years, 1985-2005, providing hourly atmospheric parameters, including winds, on 28 vertical levels on a global 40 km grid.

This presentation will introduce the modeling and assimilation strategy, highlight the available data content including the parameter set, and review the data access options available from the RDA.

Methodology

NCAR’s Real Time Four Dimensional Data Assimilation (RTFDDA) and PSU/NCAR mesoscale model (MM5 version 3.6) were used on two 40-km horizontal polar stereographic grids and sigma-following vertical coordinates. Surface, upper air and satellite measurements were continuously assimilated with observation nudging. Domain “seams” were joined with Cressman-type interpolation.

Relevant Links

RDA Home Page
http://rda.ucar.edu

CFDDA Main Data Page
http://rda.ucar.edu/datasets/ds604.0

Links to Documentation
http://rda.ucar.edu/datasets/ds604.0/#!docs

Acknowledgments

CFDDA project partners, Defense Threat Reduction Agency (DTRA), NCAR Research Applications Laboratory (RAL) and NCAR Mesoscale & Microscale Meteorology (M MM) divisions are offering this dataset to the public for free with minor restrictions.

The NCAR Computational Information Systems Laboratory (CISL), Data Support Section (DSS) support the infrastructure and software described in this presentation. In addition to the authors marked with a *, they include Joey Comer, Thomas Cross, Zhibai Li, Qing Shuster, Chi-Fan Shih, Dave Spenzak, Steve Worley and Cecilia Brunet.

How this differs from similar datasets

- Freely available to the public with minor usage restrictions.
- High vertical as well as horizontal resolution. 28 terrain-following sigma levels, from ~15 m to ~19 km Above Ground Level (AGL) with ~15 vertical layers within the first 1.5 km AGL.
- Hourly temporal resolution gives full diurnal variability. See Figure 1 for the improvement over 6-hourly models.

How can I obtain this data?

Register for access

Read to learn more

Cite the data

- Our widget makes it easy and painless.
- Improves traceability and reproducibility of your work.
- Gives credit to data providers.
- Helps us collect metrics on data use.
- Helps maintain and prioritize our funding so we can continue to provide free data and data support where it is needed most.
- Digital Object Identifier (DOI) pending for this dataset.