SOCIO-ECONOMIC BENEFITS OF METEOROLOGICAL AND HYDROLOGICAL SERVICES

INVENTORY OF DECISION SUPPORT TOOLS

ITEM	DESCRIPTION
Source	Terri Betancourt – NCAR, USA c/o Jeff Lazo – NCAR – lazo@ucar.edu
Sector	National Defense
Sub-sector	US Army
Tool Name	**Four-Dimensional Weather (4DWX) System**
Tool Description	4DWX was developed to provide high-resolution, short-term (0-48 h) mesoscale analyses and forecasts, tuned for the operational needs at each installation site.
Weather, Climate or Water inputs	The inputs that drive 4DWX are customized to those available at each operational site. In general 4DWX requires a large-scale synoptic model and diverse surface and upper air observations, including satellite and radar data input for initializing the mesoscale model.
Specific weather, climate, water data required	In particular, the following input data are typically configured as part of the 4DWX system: Large-scale models (GFS and NAM), GOES satellite, NEXRAD radar, NWS and WMO observations, wind profiler network, ACARS and AMDAR, QuikScat sea surface winds, various mesonets and users' site-specific surface and sounding observations.
Spatial resolution	The input data that drive 4DWX come in a wide range of spatial resolutions.
Temporal resolution	The input data that drive 4DWX come in a wide range of temporal resolutions.
Delivery methodology	Real-time via common internet protocols (HTTP, FTP, SSH)
Frequency of data requirement	4DWX is built upon a real-time four dimensional data assimilation scheme that allows for input data to be incorporated into the model analysis and forecast as it arrives asynchronously.
Detailed Tool Description	4DWX produces a variety of output products, some tailored to the installation site.
Spatial resolution	Output grid grid resolutions range between 0.5 – 45 km with 36 stretched vertical levels.
Temporal resolution	4DWX runs at a time interval of 1 – 6 hour, providing output every 5 minutes to every 3 hours for 36 – 48 h forecasts.
Delivery methodology	4DWX produces a variety of output products from traditional weather maps to interactive displays, to special formats required by end-user application models, such as noise propagation, atmospheric dispersion, ballistic trajectories, parachute drift, etc.
Frequency of provision	4DWX model output products can be generated as frequently as every 5 minutes or less frequently, e.g. every 3 hours, depending on the operational needs and computational resources available.
Benefits of tool application	4DWX provides mesoscale weather forecasting at a

	temporal and spatial scale not otherwise available in a fully automated operational framework.
Possible future advances	4DWX technology is moving toward probabilistic forecasting through the use of ensemble modelling, using increasing capacity of parallel computing on cluster technology.
Comments	None
URL	http://www.rap.ucar.edu/projects/4dwx/