WINTRE-MIX DATA MANAGEMENT PLAN

Updated 1December 2021

1. Real-time data collection

After approval of funding, the WINTRE-MIX team will request NSF to support the NCAR Earth Observing Laboratory (EOL) to produce a Field Catalog that will be updated in near-real time during the campaign to: 1) provide a comprehensive summary of the WINTRE-MIX datasets, 2) provide supplementary operational quick-look images of weather maps and radar and satellite images useful for project decisions during the WINTRE-MIX field campaign and in analyses after the field phase of the project, and 3) provide a long term, one-stop Data Archive to browse the data collected plus associated operational datasets. More about the WINTRE-MIX Data Archive can be found in the Data archiving section below.

An example EOL Field Catalog for the 2013-14 Ontario Winter Lake-effect Systems (OWLeS) field campaign can be found at http://catalog.eol.ucar.edu/owles . The WINTRE-MIX field catalog will be similar to this example. This comprehensive summary of the WINTRE-MIX datasets will consist of select images from specialized field data (e.g., include quick-look plots from the mobile radars and Convair, soundings from project rawinsonde launches, time-height sections from profiling radars, maps of surface mesonet data), intensive observing period reports (from PIs, flight scientists, radar operators), and other summaries of data collected during the project. The Field Catalog will also contain select images from operational high-resolution mesoscale model simulations (e.g., from NCEP, ECCC, and Northview Weather). Other operational datasets include, for example, surface and upper level weather charts, GOES East satellite images in the IR, VIS and water vapor channels, and WSR-88D level-3 reflectivity images. The Field Catalog will display images in quasi-real-time so that the PIs can use the data to assist in planning IOPs, such as Convair takeoff times and flight tracks. We will ask for the Field Catalog to include EOL's GIS tool "Catalog Map" with real-time WSR-88D base reflectivity, GOES VIS/IR imagery, locations of mobile instruments, and (if communications allow) also base reflectivity from the DOWs and Convair flight tracks.

2. Data archiving

WINTRE-MIX will also request NSF support to NCAR EOL to develop a Data Archive, a long-term archive of all WINTRE-MIX field data, in order to facilitate data access and exchange between WINTRE-MIX investigators and any other scientists who wish to analyze WINTRE-MIX datasets. This long-term Data Archive will allow for the minting of digital object identifiers (DOIs) such that WINTRE-MIX datasets can be directly cited in publications. An example EOL Data Archive for OWLeS can be found at http://data.eol.ucar.edu/master_list/?project=OWLeS .

NCAR EOL has a long record of maintaining and managing field campaign data**. All data from NSF-funded PI instruments will be stored on the NCAR/EOL WINTRE-MIX Data Archive**, including: MRR profiling radars, Parsivel disdrometers, rawinsondes, hydrometeor photography, and icing detectors. All processed data from the DOW facilities will also be stored on the NCAR/EOL WINTRE-MIX Data Archive. Raw and processed from the NRC Convair will be stored on NRC servers. Processed Convair data will be archived on a publicly accessible NRC server and datasets will be provided DOIs. A link to this NRC server will be provided on the NCAR/EOL WINTRE-MIX Data Archive. NYS Mesonet data is currently collated in a publicly accessible archive of images for a variety of meteorological fields, maintained by co-PI Dr. Bassill (example here:

https://operations.nysmesonet.org/~nbassill/archive). Any similar (or new) images or products created for WINTRE-MIX, will be incorporated into the NCAR/EOL WINTRE-MIX Data Archive. We will strongly encourage all external collaborators to post their datasets to the NCAR/EOL WINTRE-MIX Data Archive or provide links to their local archives. The instrument PIs will be responsible for timely delivery of data to NCAR EOL, according to NCAR EOL WINTRE-MIX Data Policy, and NCAR EOL will be responsible for the maintenance and open access of the NCAR/EOL WINTRE-MIX Data Archive.

Mesoscale numerical simulations generated as part of WINTRE-MIX will be archived at PI institutions. Mesoscale model simulations developed during the WINTRE-MIX research efforts may generate up to terabytes of data, and thus may be too large for long-term storage. To ensure long term reproducibility of the model analyses, WINTRE-MIX investigators will, at a minimum, archive model output used specifically to generate analyses for peer-reviewed publications. All of the metadata, model codes, and configuration files used for these simulations will be archived so that the full simulations are reproducible.

3. Data formats

All WINTRE-MIX data will be formatted in files containing adequate metadata (i.e., self-explaining files). Any data submitted to the NCAR/EOL WINTRE-MIX Data Archive will also require readme documentation that follows the Dataset Documentation Requirements. All processed (Level 2) Convair data files (remote sensing, particle imaging, scattering probes, bulk cloud measurements, aircraft and state parameters) are stored in CF-compliant netcdf format. The DOW radar files are in a standard format for radar files (DORADE-format sweep file) that can be read using NCAR-supported software. Auxiliary data collected by the DOW facility, including DOW tower meteorological data, will be QC-ed and then made available in ASCII tabular format. Scanned images of field notes, DOW deployment logs, photographs and other documentation will be provided in PDF, JPEG, or PNG format.

All rawinsonde data will be QC-ed by the providers (gross error and hydrostatic consistency checks) and made available in ASCII, BUFR, and/or netcdf format to NCAR EOL. File headers will include details on the location and time/date of rawinsonde launches. NCAR EOL will create a sounding composite dataset based on received rawinsonde data, and that dataset will be made available in the NCAR/EOL WINTRE-MIX Data Archive.

The CU and UA data collected by MRRs, icing detectors, and disdrometers will be provided in standard ASCII and/or netcdf format. Hydrometeor photography will be stored in standard image formats (e.g., PNG) and will be accompanied by metadata in ASCII text files. NYSM data is stored in netcdf format.

All datasets will be accompanied by a README.txt describing the data format, access instructions, information on QC and the accuracy and performance of the system, as well as the acknowledgment expected if using the data. Any data submitted to the NCAR/EOL WINTRE-MIX Data Archive will also require readme documentation that follows the Dataset Documentation Requirements .

4. Data access

The WINTRE-MIX Data Policy states that all investigators participating in WINTRE-MIX agree to submit their final quality controlled data to the WINTRE-MIX Data Archive Center at NCAR/EOL (or to an archive specified in this Data Management Plan) **within 6 months** after the end of the project field phase (16 September 2022). Data will then be restricted for an additional 6 months following the data submission period and PIs may have exclusive access to the WINTRE-MIX data (until 16 March 2023).

All data will be considered public domain at 12 months following the end of the WINTRE-MIX field project deployment (i.e., on 17 March 2023 and thereafter).

The WINTRE-MIX team will adhere to the WINTRE-MIX Data Policy. This applies to the data collected by Convair-580, DOW facilities, and other NSF PI-supported instruments. Collaborators (ECCC, FAA, UQAM, McGill) are all expected to make their data publicly available as well. Instrument PIs are committed to following the WINTRE-MIX Data Policy.

All WINTRE-MIX documents, including data update reports if data issues are identified in analysis, and searchable references to conference presentation, and peer reviewed publications, will be posted on the NCAR/EOL WINTRE-MIX project web pages.

5. Analysis products

Analysis products and code used to generate them will be archived at the PIs' home institutions, along with substantial documentation of methodologies. There are likely to be several work-product versions created during the process of the analysis. Not all intermediate results will be stored. We will place "frozen" versions of our final analyses and/or necessary code to reproduce them on the NCAR/EOL WINTRE-MIX Data Archive or on another publicly available repository (such as GitHub) for all fields used in manuscripts approved for formal publication.