Development of a unified dropsonde quality assurance and visualization capability

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Summary of Current Status

The new version of ASPEN, ASPENV3, has been built, tested, and is nearly ready for operational use by NOAA and the AFRC during the 2011 hurricane season. ASPEN V3 has been migrated to the NOKIA QT graphics packages and runs on Windows XP and W7, Linux, and Mac OS X operating systems. Additional capabilities, such as synoptic map plotting and manual editing of the raw data, are being added to the software suite. The project remains on schedule to have a fully operational version in use this summer along with the necessary training and documentation for the ASPENV3 users.

Accomplishments and current developments include:

A new operational version of the dropsonde processing software had been developed and built and is called ASPENV3. Using Nokia Qt, multi-platform operation of ASEPNV3 is 100% demonstrated on Windows XP, Windows 7, Linux and Mac OSX and only minor bug fixes need attention.

A web-based project management toolbox and issue-tracking center using the commercial software, JIRA, has been used extensively for the development of ASPENV3. Here, members of the APENV3 working group, or other invited participants, can easily view and upload issues relating to this project. Project managers can then view any issues, make changes or additions to the software and post the results on the website. This allows for a very efficient mean of tracking and fixing any issues that arise with the software package during the development stages.

AspenV3 has been extensively evaluated and shown to produce same results as ASPENV2, the current operational version.

AspenV3 was successfully used operationally in the NSF/NCAR PREDICT campaign from dropsondes released on the NVAR GV aircraft. The software was also used for the NASA GRIP field program for the NASA DC8 dropsondes.

Batch ASPEN has also been ported to V3 which allows users to quickly process multiple

dropsonde profiles from a single or multiple flights.

Additional quality control (QC) upgrades are currently being implemented in ASPENV3. One of the additional capabilities is the plotting of synoptic maps of dropsonde observations at standard atmospheric levels from a series of dropsondes such as those from a single flight. This feature will allow users of dropsonde data to quickly and easily spot faulty data by comparing nearby observations. The synoptic mapping will be fully interactive and will allow the users to pan or zoom the data window and will have detailed geographical overlays built in. The synoptic maps will also reside as a stand-alone program, allowing forecasters or researchers the ability to view the observations from a flight without having to use the raw sonde data.

Another capability of ASPENV3 that has been implemented is the manual editing of the raw data by selection of text boxes. This allows for efficient removal of faulty data that could result in erroneous data being transmitted with the WMO TEMP DROP message. A system of data "flags" assigned to each data point is being incorporated so that a users of the QC'd data will know the what alterations have been done to the processed data.

ASPENV2 displayed data from only one of the two RH sensors from the dropsonde profile, the one that the aircraft dropsonde software assigned to be used for the QC process. ASPENV3 will have the ability to plot data from both RH sensors and allow the user to determine which one to use in processing. A correction for an RH dry bias will also be implemented when the operator decides that a particular dropsonde needs such a correction. This feature has been on the HRD dropsonde QC software and has been used extensively by trained operators. The use of this feature will require some additional training.

Automatic creation of multiple format ASCII high-resolution data files has been implemented and one of the output types is the HRD file format, used in their archive of processed dropsonde profiles. ASPENV3 can also be used as a file converter so that processed data can be converted from one file type to another. This is especially important for analyzing historical data that may be in a different format that a user is accustomed to.

Plans are underway to incorporate ASPENV3 on AFRC 53rd aircraft before this hurricane season. Hands on training will be provided by the JHT project Co-PIs and web based training videos will also be available. The AFRC will have a single, stable version to use throughout the flight season. NOAA AOC will also have the use of ASPENV3 for their 2011 hurricane flights and will have the opportunity to test additional versions as they become available during the season.

Near Term Goals

Have ASPENV3 installed and tested for operational use on the AFRC and NOAA aircraft prior to the 20011 hurricane flying season. Provide training on the use of the new software package to the aircraft dropsonde operators.

Continue work on the development of an automated validation system, which will provide an objective method for comparing processing results between Editsonde and ASPENV3. It will also provide a method for validating software modifications to unified software package as development continues in future years.

Continue to add upgrades and capabilities to ASPENV3 for testing and evaluation. One of these additions may include a "first guess" as to whether or not a dropsonde profile contains valid data to the surface which is critical for assigning accurate heights to processed data. Another option would be to plot Skew-T diagrams for wither the raw data or QC results. Continued feedback from the users community will be used in guiding any further developments