



A US Effort for ADM/Aeolus Calibration and Validation

M. Hardesty , CIRES/NOAA

S. Boukabara, A. Brewer, J. Dunion, J. Yoe, R. Hoffman (NOAA);
R. Ferrare, J. Hair, C. Hostetler, M. Kavaya, M. McGill (NASA):
Z. Pu U. of Utah); S. Tucker (Ball); D. Emmitt (SWA):
C. Velden, I. Genkova (NOAA/CIMMS)

Proposal objectives



- Obtain and analyze aircraft measurements of wind speed and direction, aerosol structure, aerosol backscatter, aerosol extinction, cloud climatologies and relevant parameters under the Aeolus flight track using remote sensors and dropsondes
- Develop a data set extending over the life of the mission from surface remote sensors and in situ sensors (radiosondes, dropsondes, aircraft winds) by gathering and analyzing measurements when Aeolus measurement volume coincides with sensor locations
- Investigate correlations, differences and synergisms between Aeolus and Atmospheric Motion Vector winds derived from cloud and water vapor motion
- Investigate Aeolus data quality based on assimilation studies.



Description of CAL/VAL techniques to be applied



- **Airborne underflights**
 - **Direct and coherent detection lidars**
 - **Multi-wavelength, HSRL aerosol lidars**
 - **Dropsondes**
- **Surface observations during overpasses**
 - **Upward-looking Doppler and aerosol lidars providing long term data sets**
 - **Radiosondes**
- **Atmospheric Motion Vector Comparisons and synergisms**
- **Data Assimilation Studies**



US Effort: Contribution to Aeolus CAL/VAL requirements



- Investigation of Aeolus Level 2 wind/aerosol product accuracy and precision
- Investigation of Aeolus Level 2 wind/aerosol product representativeness and impacts of atmospheric spatial and temporal heterogeneities
- Validation of Aeolus wind products by assessing impact of assimilation into NWP models
- Comparisons of Aeolus wind products with atmospheric motion vectors and synergisms



Status of manpower, tools and funding

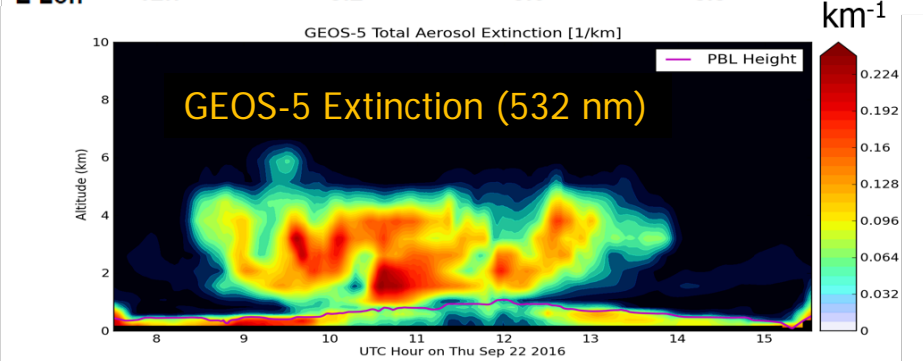
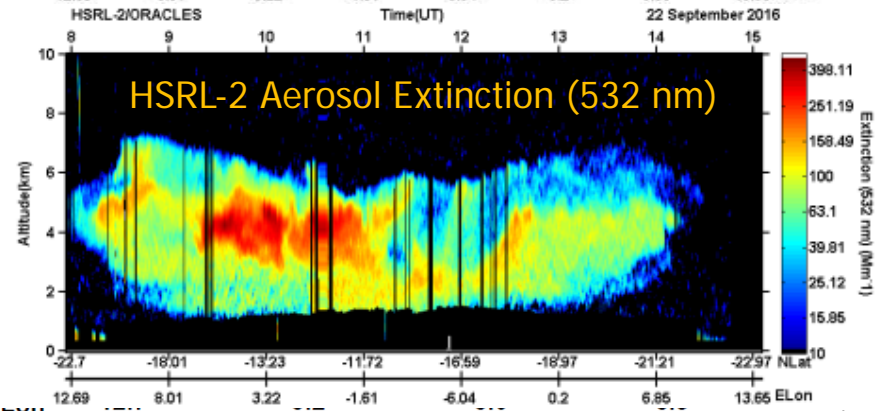
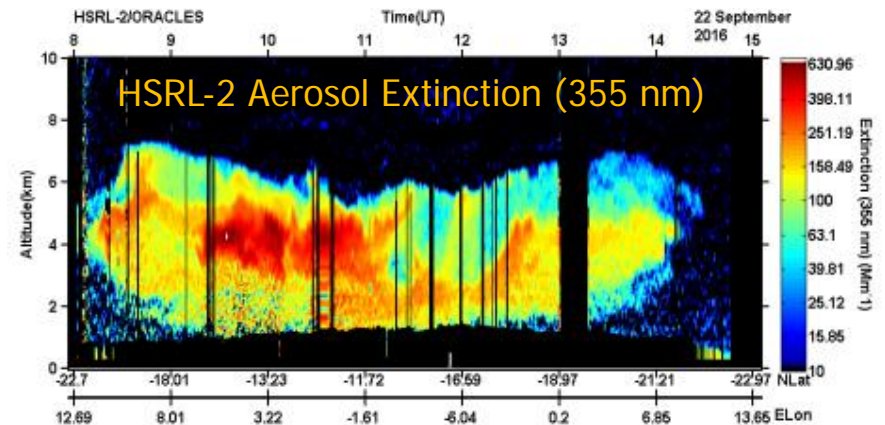
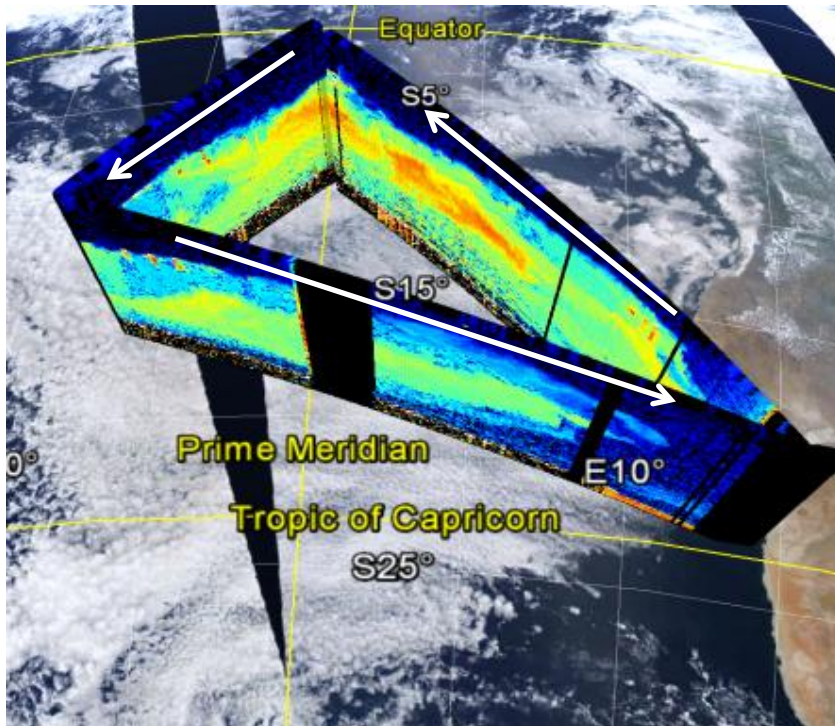
- **Two investigators have dropped out since original proposal: Gentry (other directions) and Gimmestad (retired).**
- **Airborne underflights of Aeolus track require coordination with science missions (identification of potential missions and funding discussions with program managers are occurring now).**
- **AMV studies will likely require some additional support (discussions ongoing).**
- **Dropsonde comparisons during P-3 hurricane campaigns planning on using support base.**
- **Assimilation studies by JCSDA will be done as part of mission.**

Airborne HSRL-2 Measurements of Smoke over Clouds in Southeastern Atlantic Ocean



- HSRL-2 measurements and GEOS-5 model show persistent smoke layer above low stratus clouds
- Smoke layer could be convenient target for assessing ADM-Aeolus measurements of aerosol backscatter

HSRL-2 Aerosol Backscatter (355 nm)



Next steps

- **Firm up commitments and support with program managers as Aeolus launch schedule becomes clear.**
- **Determine availability of internal support from NASA and NOAA.**
- **Develop notional flight plans (for airborne missions), data sampling strategies and data analysis for observational comparisons, investigate synergisms and conflicts with science objectives.**
- **Where feasible and as time permits, use simulated Aeolus data and Cal-Val tools to simulate a full data gathering and analysis exercise for each component of the US effort.**