Satellite Coincident Reference Upper Air Network and Potential Impacts on Real-time and Retrospective Satellite Products

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A satellite coincident Reference Upper Air Network is proposed to provide reference radiosonde and in-situ ground based measurements coincident with operational polar satellite(s) overpass. This proposed network would consist of approximately 40-50 sites, including existing Global Upper Air Network (GUAN) and Atmospheric Radiation Measurement (ARM) stations. The overall design would be to provide a robust and reliable sample of collocated global radiosonde and satellite observations conducive to the monitoring and validation of satellite and radiosonde observations and associated scientific approaches including radiative transfer models. The routine operation of such a network in conjunction with operational polar satellites would provide a long-term record of performance for these critical observations, of particular importance for climate, as well a shorter term monitoring useful for numerical weather prediction.

Details concerning the latest protocols for designing and operating such a network are presented. This includes specific recommendations from the recently held joint NOAA/Global Climate Observing System (GCOS) Workshop for upper air observations (February, 2005) that a program to establish a Reference Upper Air Network be pursued. Preliminary activities to establish routine data collection from ARM sites, NOAA-NWS sites and existing global sites already providing satellite coincident observations are also presented.

The potential impact of the proposed reference network with respect to the suite of integrated global measurements (including derived satellite products) available for respective climate and NWP applications is also discussed. Such data require that systematic errors and uncertainties be compensated for prior to assimilation. The poor historical record of such parameters may be compromising the value of critical upper air observations particularly for climate; examples are shown.

The integration of this network and planned scientific upgrades for ATOVS derived products to better meet anticipated user requirements for real-time NWP and retrospective climate products is also presented.