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Validation of the NearCast product over Europe during summer season 2015

Ivan Smiljanic (1), Natasa Strelec Mahovic (1), and Ralph Petersen (2)

(1) Meteorological and Hydrological service, Zagreb, Croatia (smiljanic@cirus.dhz.hr, strelec@cirus.dhz.hr), (2) CIMSS, University of Wisconsin-Madison, USA (ralph.petersen@ssec.wisc.edu)

With a goal to fill in the temporal gap between the observation-based nowcast and NWP forecasts, a NearCasting model based on GOES Sounder Derived Product Images has been developed by CIMSS as a part of the GOES-R Risk Reduction program. The NearCasting system uses a simplified Lagrangian model to project full resolution GOES soundings into the near future to augment conventional NWP output and to identify areas favorable (and not favorable) for convective development 3-6 hours in advance of storm formation.
Besides already well tested NearCast products that use GOES sounder data, the same method has been applied on SEVIRI data, specifically the temperature and moisture retrievals used to generate GII products. These retrieval uses SEVIRI water vapor channels: 7.3 microns and 6.2 microns, as well as a NWP model first guess. These two channels can help to define the vertical distribution of layer-averaged water vapor (precipitable water) at different levels in the atmosphere. The products derived from SEVIRI water vapour information include lower-level (centered near 780 hPa) and mid-level precipitable water (centered near 500 hPa) and vertical precipitable water gradient, as well as Theta-e at lower- and mid-levels and its vertical gradient.
These fields can be used to identify areas where sufficient lower-level moisture and total thermal energy is acumulating to support convection. The vertical gradient fields can be used to identify areas where, over the next 1-9 hours, upper-level dry air will be moving over lower-level moisture, often a precursor to rapid convective development. The fields are presented as moisture change with height. If a region shows the moisture change with height increasing quickly with time, then the region is more likely to support rapid convective development.
In previous case study experiments, projections of SEVIRI sounding data were proven to be useful in diagnosing the pre-convective environment evolution in a case of un-forecasted, isolated summer-time convection. In this work, the NearCast products based on SEVIRI data will be tested for the region of Central Europe and Mediterranean. Destabilization indicated by increase in lower-level moisture and large vertical Theta-e gradients will be compared to radiosonde-based stability indices, GII and NWCSAF stability products. The utility of the product in anticipating convective development (or non-development) in the real-time will be verified using satellite, lightning and radar data for the indicated area.