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A two-year verification study over Italy using reforecast data of the QBOLAM limited area model in the frame of the HYDROCARE project

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In the framework of the EU HYDROCARE project – INTERREG III B CADSES, a 10-year reforecast (retrospective forecast) database of gridded meteorological surface fields is generated by using an upgraded version of the QUADRICS BOlogna Limited Area Model (QBOLAM). The reforecast dataset will be used to perform statistical studies on drought and hydrological cycle and also to evaluate the improvement on precipitation forecast due to the upgrade. In the present work, attention is drawn on the latter verification study; whereas the hydro-meteorological investigation by means of reforecast data will be addressed in a future work. QBOLAM is operational at APAT (Italian Environment Agency) as a part of the Sistema Idro-Meteo-Mare (SIMM) forecasting chain, with a 0.1° grid step over a domain covering the Mediterranean basin. ECMWF analyses and forecasts provide the initial and boundary conditions, respectively. The SIMM modelling chain includes also a 0.1° wave model over the Mediterranean Sea, a shallow-water version of the Princeton Ocean Model for sea elevation over the Adriatic Sea and a finite element model for sea elevation in the Venice Lagoon. The QBOLAM version employed to build the reforecast database differs from the operational one due to the improvement of the cumulus convection (Kain-Fritsch parameterisation) and the porting over a new parallel platform, from a QUADRICS APE-100 to an 8-processor SGI ALTIX machine. The increase of computational power made it possible to carry on a massive program of retrospective

forecasting. Thus, in order to assess the precipitation forecast enhancement, a two-year verification study is performed for the period from Oct. 2000 to Oct. 2002 using a dataset of rain gauges covering Italy. This period is the same as the first systematic limited area model (using the QBOLAM operational version) precipitation verification over Italy. The verification approach includes non-parametric skill scores and continuous measures. The object-oriented contiguous rain area analysis is also applied in order to assess horizontal spatial forecast errors. Results are compared with the ones obtained with the QBOLAM operational version by means of the bootstrap resampling technique, which provides skill score results along with confidence intervals.