Topographic-dependent horizontal localization scales scheme in GRAPES-MESO En-3DVAR hybrid assimilation system

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Based on the GRAPES-MESO En-3DVAR hybrid assimilation system(hereinafter referred to as En-3DVAR) constructed by China Meteorological Administration,A 7 days batch tests was conducted for the horizontal localization scales,the batch tests time is form 10 July 2015 to 16 July 2015,48h forecast have been designed for each test, seven different horizontal localization scales of 250,500, 750, 1000, 1250, 1500 and 1750 km are set.The batch tests results showed that the optimal horizontal localization scales in the Tibetan plateau and plain,is 1500km and 1000km respectively. For the above results,based on the GRAPES-MESO En-3DVAR hybrid assimilation system, a topographic-dependent horizontal localization scales scheme(hereinafter referred to as En-3DVAR-TD-HLS) has been constructed. The data assimilation and forecast experiments have been implemented by En-3DVAR,3DVAR and En-3DVAR-TD-HLS, and then compared the analysis and forecast field of these three system. The results showed that,the analysis field,6h and 12h forecast field of En-3DVAR-TD-HLS are better than the other two data assimilation systems,in particular of the analysis field, the root mean square error(RMSE) in the entire vertical levels were significantly less than the other two systems; The time series of total RMSE showed,in the 6-30h forecast aging,the forecast result of En-3DVAR-TD-HLS is obviously better than the other two systems,and the result of En-3DVAR and 3DVAR is equivalent.The forecast results of the three data assimilation systems in 36-48h are equivalent.