



Object analysis of precipitation from satellite measurements, reanalysis ERA-Interim and WRF model over the Europe and North Atlantic

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Object based analysis of precipitation from the Weather Research and Forecasting (WRF) model, ERA-Interim reanalysis and CMORPH satellite measurements is performed. The datasets are compared over Europe and North Atlantic between 25°N and 60°N and 60°W and 35°E for time period of 11 years (from the year 2000 to 2010). Datasets have a high spatial-temporal resolution (0.25 degrees and three hours). Analysis showed that the WRF model overestimates the precipitation (compared to the satellite measurements) for around 30 %, which is in agreement with most other studies. ERA-Interim reanalysis overestimates the precipitation for only a few percent. Despite the difference in the total amount of rainfall, the spatial distribution of annual precipitation is similar for all three datasets, with maximum in the northern Atlantic, local maximum at the orographic barriers and minimum over North Africa. ERA-Interim has less heavy precipitation as WRF and CMORPH. CMORPH has less weak precipitation than the other two products. For the identification of the precipitation systems the FiT object identification algorithm was used. We have chosen preliminary values of smoothing radius 0.75° and three precipitation thresholds of 0.5, 2 and 4 mm. The analysis showed the largest objects are in ERA-Interim and the smallest in WRF. In general the objects over the Atlantic are larger than the objects over the continent. We examined the lifetime of every precipitation system and defined the predominant direction of movement of precipitation objects. The analysis showed the highest number of long-lived objects are found in WRF and the lowest number in CMORPH. Precipitation systems with the longest lifespan appear in the autumn. Most of the objects with shorter lifespan occur in spring and summer. Objects with shorter lifespan are typically located over the continent. Precipitation systems with longer lifespan are more common over the Atlantic. Movement of precipitation objects is dominated by eastward movement. Movement towards the west is dominant only in the summer and autumn in the southern part of the domain over the North Atlantic. Westward movement is also present over Europe but is not dominant.