EMS Annual Meeting Abstracts
Vol. 16, EMS2019-912, 2019

Aircraft based observations in AROME/HU

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The data assimilation system of the AROME model in Hungary is based on conventional observations. Since the end of 2016 two aircraft based observation types have been introduced operationally in AROME 3DVar assimilation system: AMDAR humidity and Slovenian Mode-S MRAR observations. Unfortunately since the operational introduction the number of AMDAR humidity measurements has not increased, there is still only a couple of aircrafts which is equipped with humidity sensor (the sensor measures mixing ratio of water vapor which can be converted to specific humidity for the assimilation). However, these measurements are very important because they can give useful information about the vertical structure of the troposphere, especially when the aircraft is in descending or ascending phase. Comparing with TEMP they are more frequent and they give additional good quality information for the model when there is no radiosonde launch. The impacts of AMDAR humidity were studied on a longer time period. 24 hours forecasts from 00, 09 and 12 UTC were prepared with 3-hour data assimilation cycle. As expected, biggest impact can be seen in the 09 UTC run (no radiosondes), especially in cloud cover. Mode-S MRAR observations were received from Slovenia and since the AROME/HU domain contains Slovenia the impact of these observations was in the center of interest. Observations arrive from a small area compared to the AROME domain, so verification scores were calculated over a smaller domain (Slovenia and southwest Hungary). Results show mainly neutral impact, bias of wind gust and ETS of precipitation indicate a little improvement.