

# The Coronavirus Pandemic 2020: Reduction of the number of aircraft observations and steps taken at DWD to mitigate the impact

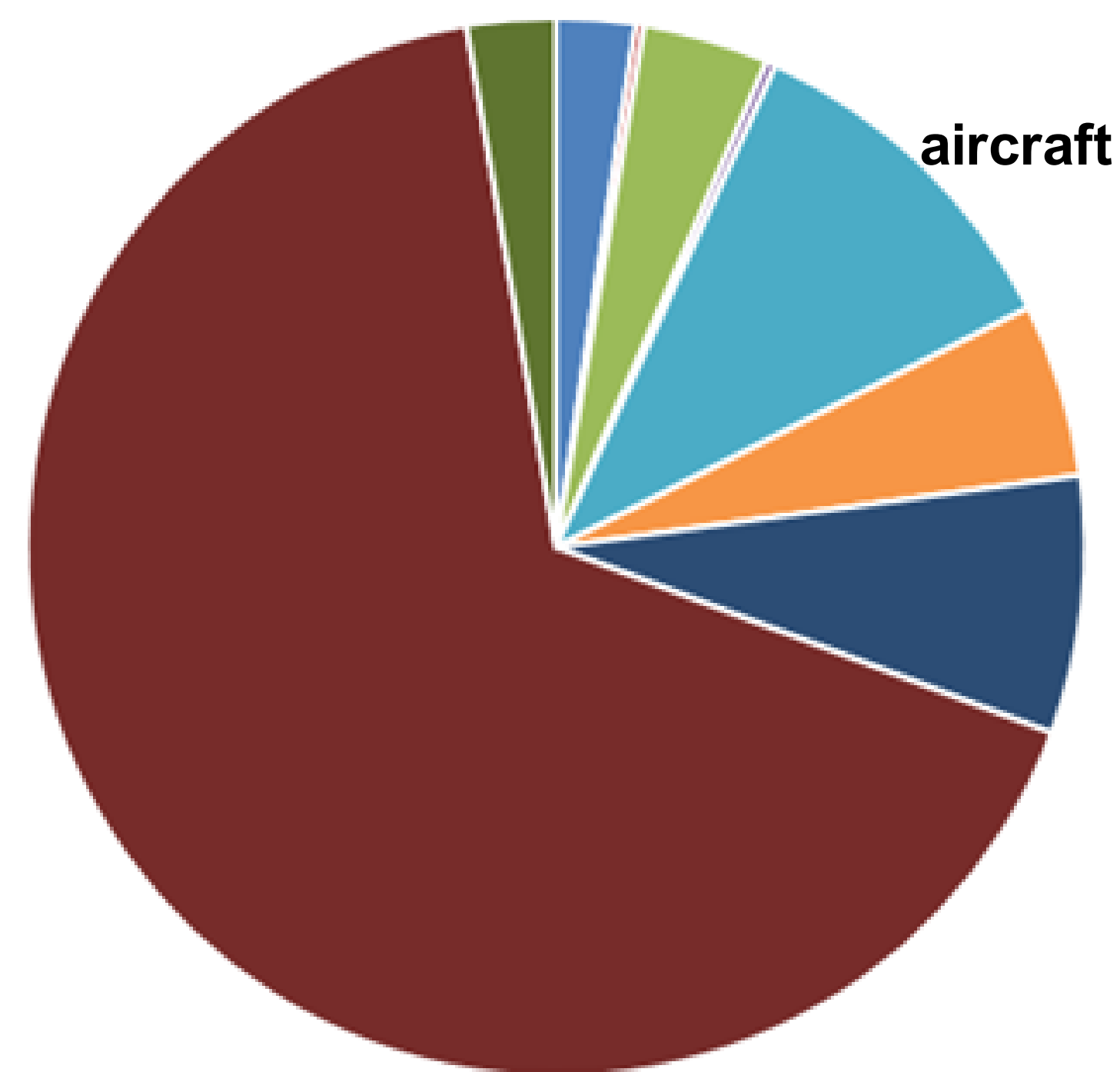


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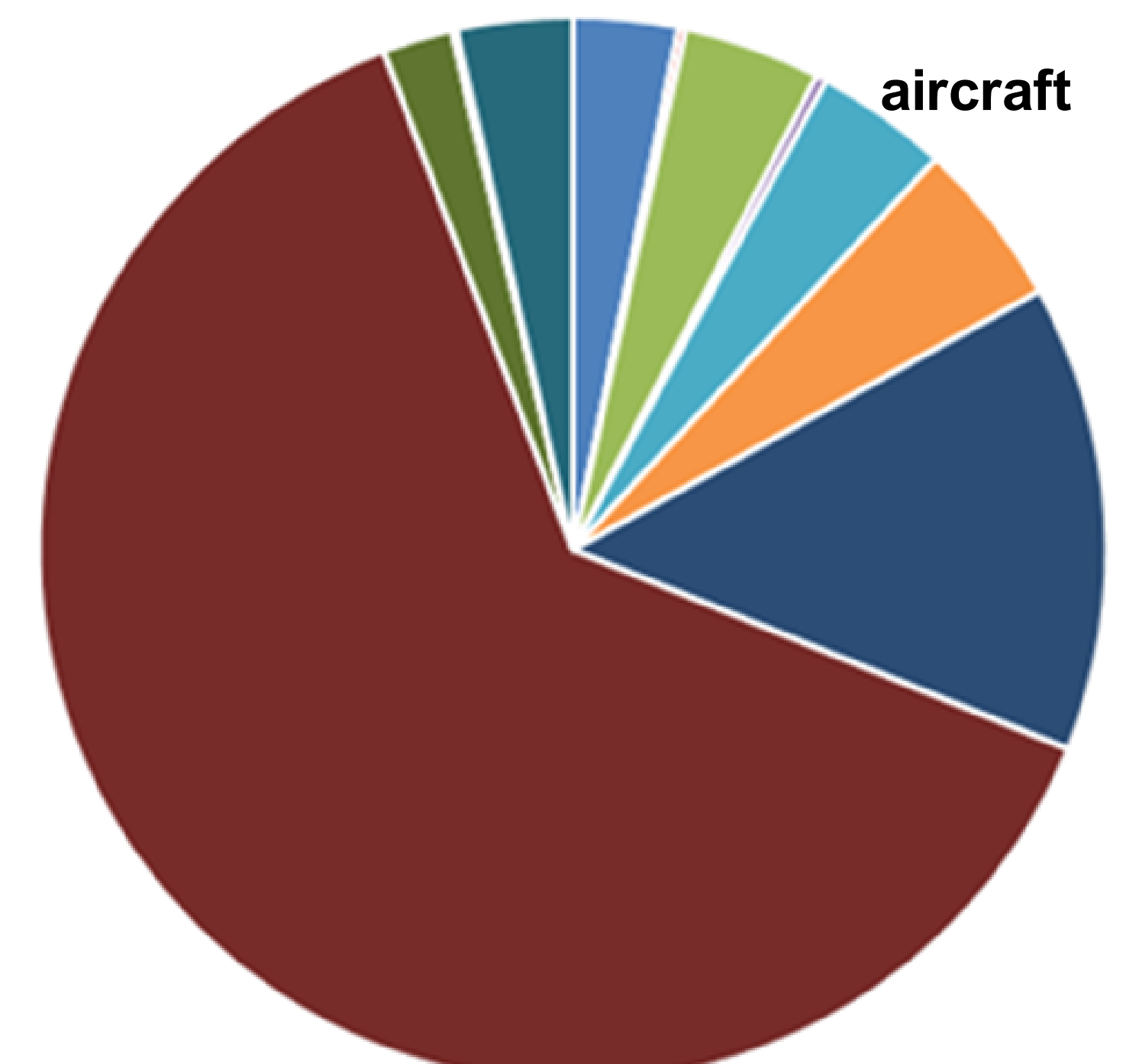
Global NWP model ICON and ICON-EU nest



June 2019: 5.1 Mill. observations / day

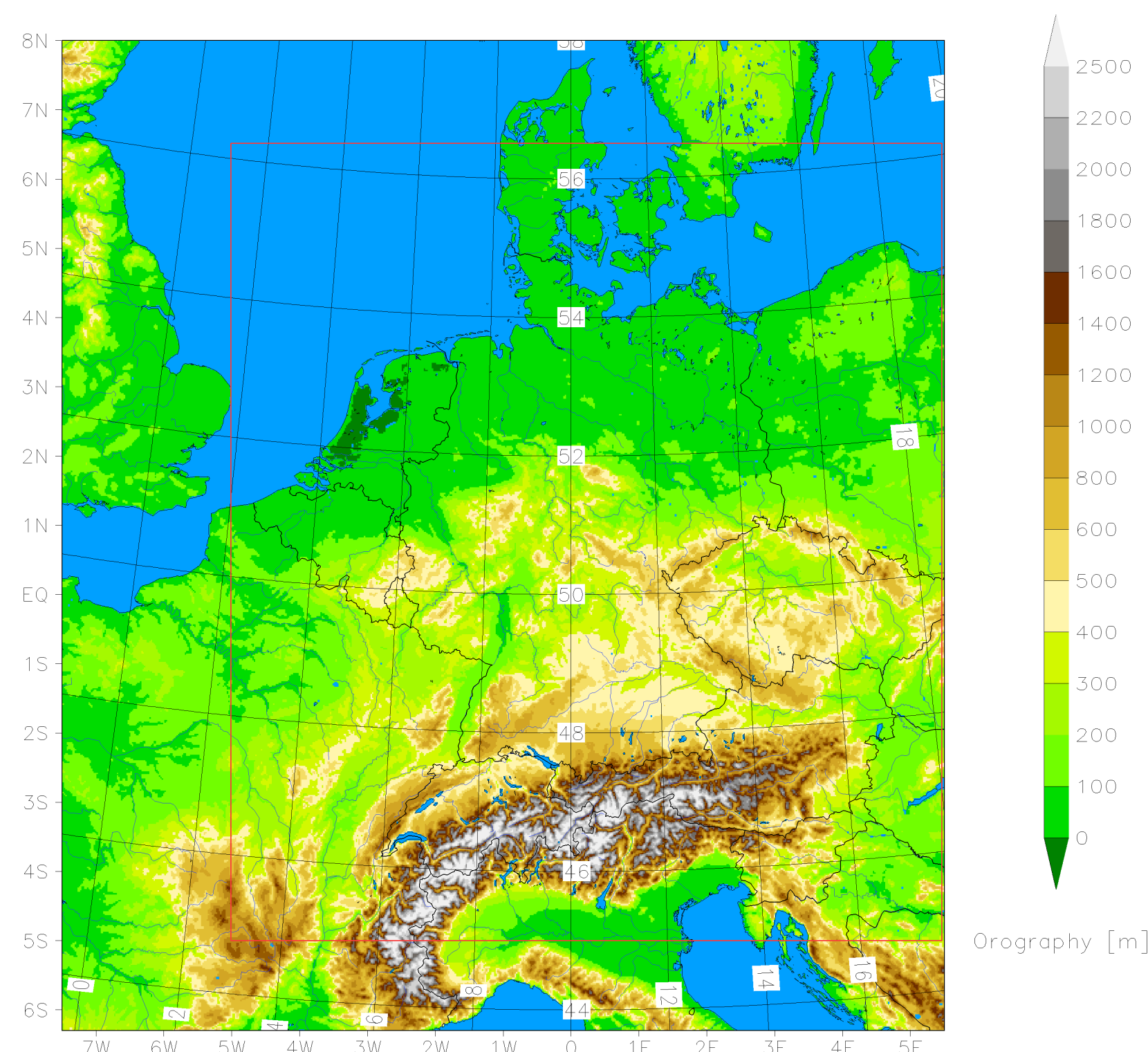


May 2020: 4.9 Mill. observations / day

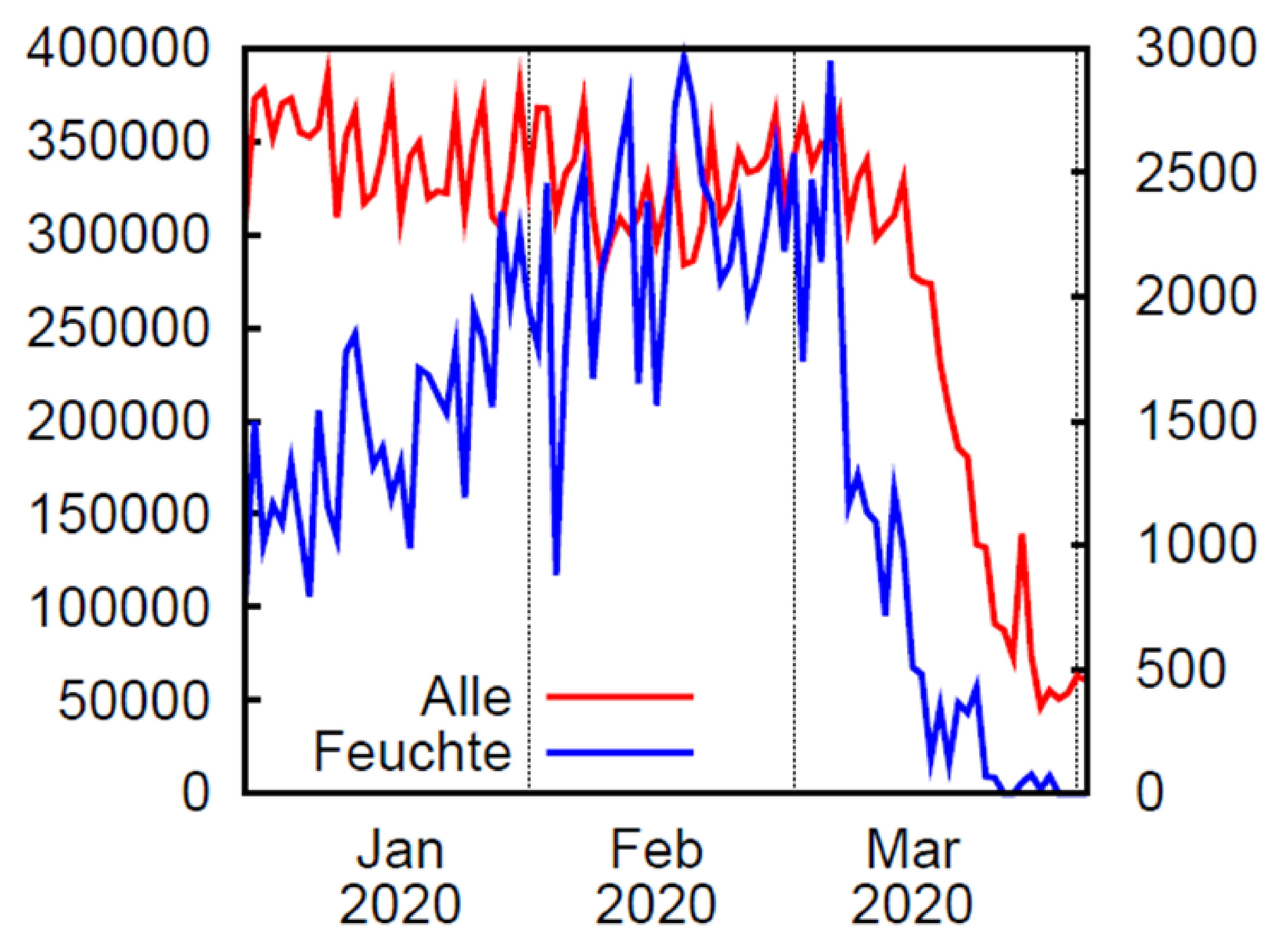


The coronavirus pandemic in 2020 had a severe worldwide impact on the number of flights operated by the airlines. From mid of March until mid of May 2020 the number of flights decreased dramatically to about 50% of normal values. Regionally, especially in Europe, the reduction was even more pronounced.

Therefore, also the daily number of aircraft observations (AMDAR, AIREP, ACARS, Mode-S) received at Deutscher Wetterdienst for our global NWP system ICON decreased from 1.520.397 (on 15 Jan. 2020) to 790.590 (on 15 July 2020). For the regional NWP system COSMO-D2 the daily number of aircraft observations even dropped from 350.000 (in January 2020) to 50.000 (in May 2020).



Domain of the regional model COSMO-D2.



Number of aircraft observations per day used in COSMO-D2. Red line and left axis labelling: Observations of pressure, temperature and wind by all air-crafts. Blue line and right axis labelling: Observations of humidity by 9 Lufthansa A321 aircrafts.

Steps taken at DWD to mitigate the negative impact of the reduced number of aircraft observations on forecast quality.

Since **02 April 2020**:

Additional TEMPs at 06 UTC for the stations Essen, Stuttgart, Meiningen and Oberschleißheim → **ICON** und **COSMO-D2**

Since **16 April 2020**:

Assimilation of Global Navigation Satellite System (GNSS) humidity observations (Zenith Total Delay, ZTD) → **ICON**

Since **19 May 2020**:

Assimilation of ADM-Aeolus wind measurements; assimilation of descent data of TEMPS in Germany, UK and Switzerland → **ICON**

Since **17 June 2020**:

Assimilation of radar volume data; assimilation of descent data of TEMPS in Germany and Switzerland → **COSMO-D2**

Planned for **October 2020**:

Assimilation of Tropospheric Airborne Meteorological Data Reporting (TAMDAR; FLYHT Inc.) aircraft observations → **ICON**