Coronavirus also Misleads Weather Forecasts!

The fact that commercial passenger flights have come to a stopping point due to the COVID-19 pandemic has become a challenge for meteorologists, as weather forecasts models are based on temperature and wind data collected from thousands of aircraft in the sky!

Commercial passenger aircraft automatically send meteorological data obtained via various sensors during flight to ground stations through communication systems. The U.S. National Oceanic and Atmospheric Administration - NOAA supports its weather forecast software with more than 250 million annual measurements obtained from aircraft. However, experts now have concerns because as of the end of March, meteorological data from aircraft have declined by half due to the sharp drop in air traffic.

According to the World Meteorological Organization, the in-flight measurements are a key source of information both for weather forecasts and for monitoring climate changes. The Geneva-based organization declared that thousands of aircraft in the fleet of 43 airlines contributed to the Aircraft Meteorological Data Relay Program (AMDAR), and they produced and shared more than 800,000 observations daily on issues such as air temperature, wind speed and direction, humidity and even turbulence.

The airlines have grounded nearly all aircraft in their fleets throughout the world due to the travel restrictions caused by the ongoing coronavirus outbreak and the reduction in flight demand has considerably reduced the data obtained. The World Meteorological Organization reported that the data obtained from aircraft fell by 50%-80% in many parts of the world, particularly in Europe and the U.S.

This decline is also anticipated to have a negative impact on the quantity and quality of weather forecasts. The continuation of such a significant loss of data from aircraft and the expansion of regions where this becomes unavailable may create a gradual decrease in the reliability of weather forecasts.

What kind of data is used for weather forecasts?

The World Meteorological Organization collects a wide variety of data from satellites, ground stations, ground tracking systems and marine-based stations, in addition to aircraft in order to forecast the weather. While satellite data provides a lot of information about temperature and humidity, it provides less information about wind. The European Center for Medium-Range Weather Forecasts (ECMWF) says

the aircraft data comes in second, behind satellite data. However, satellite wind observations recently integrated in the system will help compensate for the drop in the number of aircraft-based observations. Furthermore, even though there is a significant decrease in commercial passenger flights, the ongoing cargo and evacuation flights continue to be used to obtain data, albeit limited.

It is thought that removing all aircraft data degrades forecasts by up to 15%. Some EU member states are exerting efforts to receive more data by sending more radio and sound waves to high altitude balloons to conduct meteorological readings to compensate for the lack of data from aircraft, especially in Europe.

Coronavirus reduces manual data entry as well

Of course, not only the U.S. and Europe, but also other parts of the world are at risk. The majority of ground monitoring stations automatically send data to weather forecast units. However, in many developing countries, data is manually obtained by observers. In some countries, there are almost no radar stations available.

The World Meteorological Organization reported that a substantial drop in the number of manual observations has occurred

since the start of the outbreak. The reduction in such data flow due to the pandemic may cause some disruptions in early detection of meteorological events and disasters, such as floods and hurricanes, which is unfortunately not a desirable thing for our planet.

Impact of flight data on weather forecasts

A test was run in 2019 on weather forecasts to measure the impact of data obtained from aircraft. The difference between the reports not involving aircraft data and the reports involving all related data was revealed.

The greatest difference between forecasts was observed in the data obtained from the aircraft at the standard cruising altitude of 10 and 12 km. Geographically, the biggest difference between the reports was in the northern hemisphere for both wind and temperature forecasting.

According to experts, removing half the aircraft data from weather forecasts would be expected to give slightly less than half the impact of removing all aircraft data. Briefly, the more aircraft data that is involved in reporting, the better, as it will lead to better forecasting results ●