AIRS observes sulfur and ash plumes from Iceland's Grimsvotn volcano

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One year after the Eyjafjallajökull volcano eruption, Iceland volcanism is in the news again, this time with an easier name but much more power. The **Grimsvötn** volcano under the Vatnajökull ice cap woke up with an explosive eruption on Saturday, May 21, 2011.

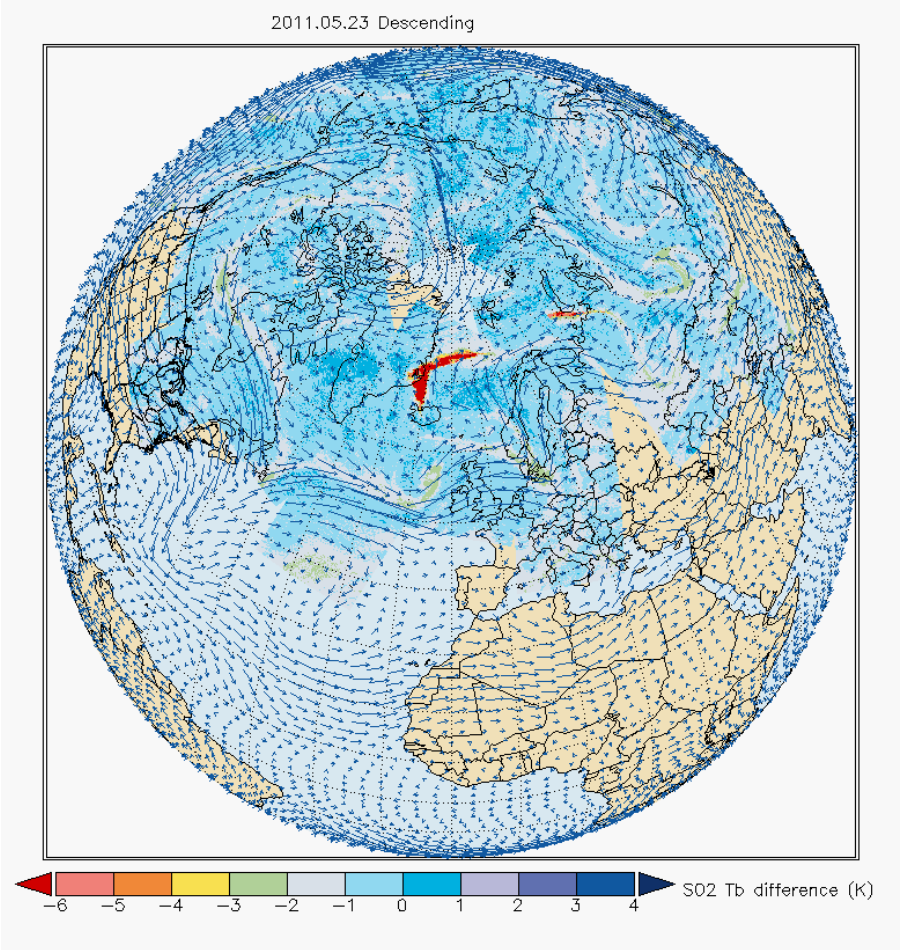

Figure 1:

AIRS SO2 indicator, and 300 mb winds from GEOS-5 forecast; a snapshot for May 23, local early morning.

The Atmospheric Infrared Sounder (AIRS) on NASA's Aqua satellite clearly revealed a gigantic plume of sulfur dioxide SO2 released into the atmosphere (see GIF image animation in Figure 2). Together with NASA's Goddard Earth Observing System Data Assimilation System (GEOS DAS), the AIRS retrieval shows the interesting development of the plume (colored red in the animation) spreading over thousands of miles in opposing directions, evidently captured by winds in the upper tropospheric layers. As was expected earlier, the plume showed over northern regions of both Canada and Russia and is still clearly visible six days after the eruption, hitching a ride with the polar jet back East, to where it started from. The interesting wind pattern shows that the winds aloft

initially pushed the plume north, and then dissipated it into a more tenuous feature, thus reducing fears it would propagate south to England and Europe, at cruising altitudes, and cause a repeat of the air-traffic nightmare from last year.

These concerns were justified, though, given lower troposphere winds revealed a tendency to transport heavier ash particles south-east from Iceland, unlike the SO2 plume, see Figure 3 where ashes are seen as dark-yellow cloud south from Iceland. Accordingly, President Obama cut his planned visit to Ireland short by one day, and the Barcelona soccer team traveled early to London in preparation for their Champions League final against Manchester United, both to avoid potential travel complications caused by volcanic ash.

Corrosive sulfur dioxide aerosols in the upper atmosphere can damage aircraft windows, necessitating their costly replacement, even if they do not pose a hazard to aircraft operations at altitude.

The SO2-driven brightness temperature differences used in Figure 1 are from the near-real time AIRS data product AIRIBQAP_NRT, whereas the winds are from the GEOS-5 experimental forecast. "Descending" and "Ascending" refer to Aqua's orbital node, resulting in Aqua's flying over Iceland in the early morning and the afternoon, correspondingly. The false-color image is built using AIRVBRAD_NRT. (Click on either image to see it larger.)

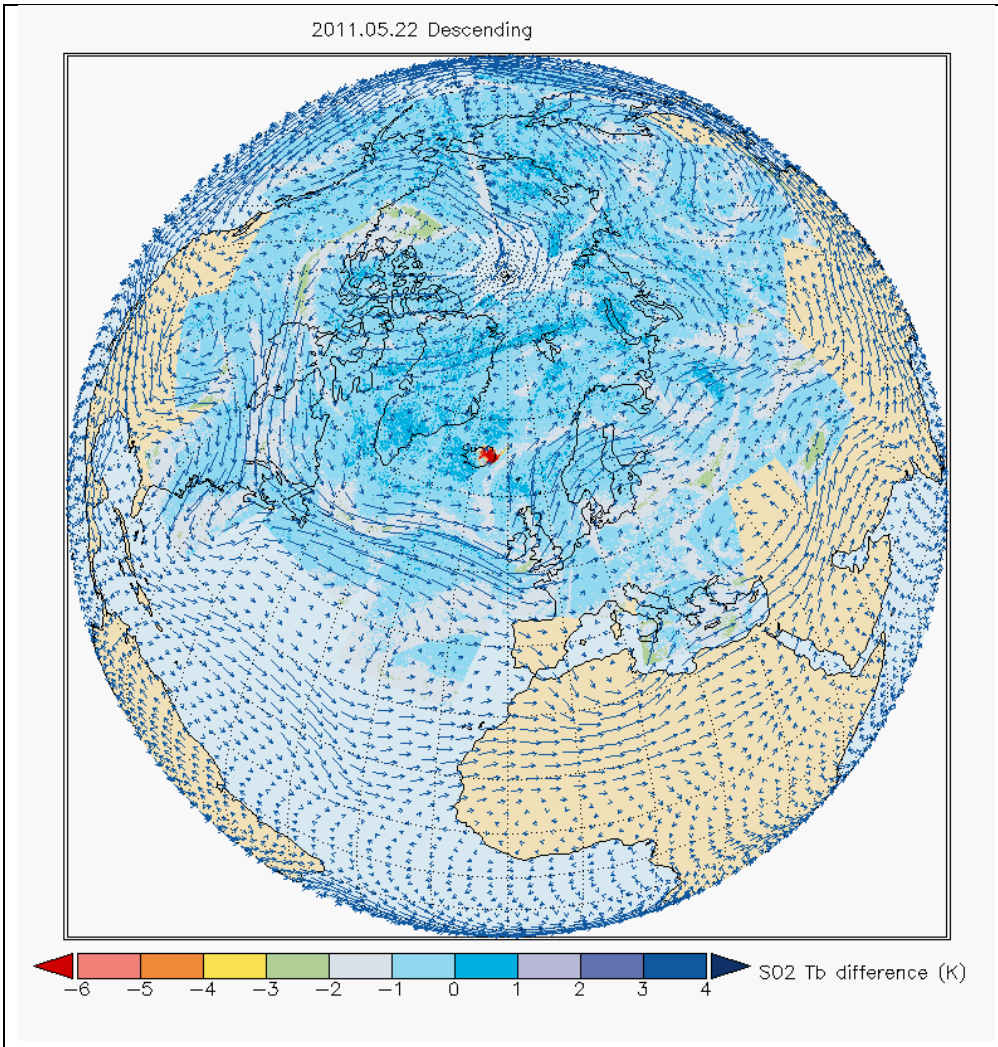

Figure 2:

GIF image animation of AIRS volcanic SO2 indicator, and 300 mb winds from the GEOS-5 forecast, for May 22-26.

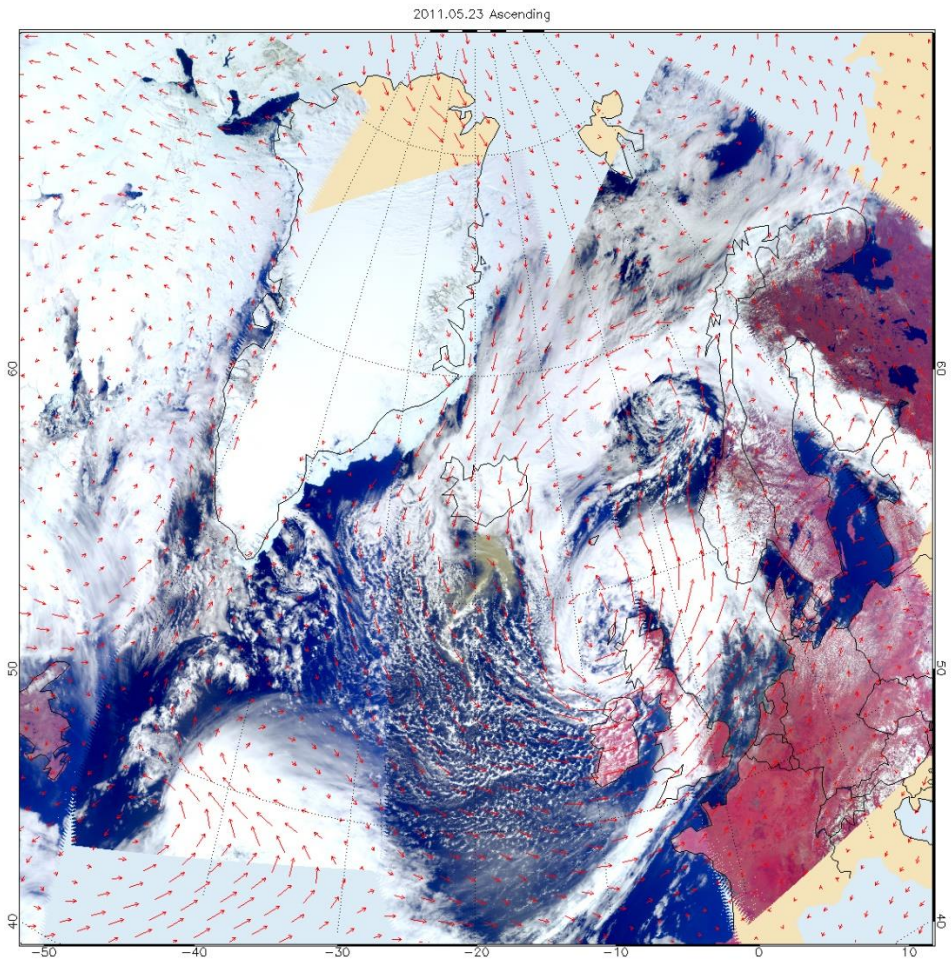

Figure 3:

High-resolution false-color image from AIRS visible bands, and GEOS-5 winds at 850 mb, May 23, 2011. Heavier ash particles, unlike the SO2 aloft, are seen to be transported by lower-troposphere winds southward from Iceland.

Relevant links:

AIRS Near-Real Time data and imagery

GEOS-5 products from the Goddard Modeling and Assimilation Office