

TR2Ex. Tonga volcano Rapid Response Experiment

Abstract: On January 15, the Hunga Tonga - Hunga Ha'apai volcano north of Tongatapu in the south west Pacific erupted with ash and sulfur dioxide (SO₂) gas reaching into the stratosphere to altitudes up to or higher than 30 km. This eruption provided the opportunity to study the microphysical processes that occur when SO₂ gas is emitted into the stratosphere and will help to improve the accuracy of atmospheric models. To take advantage of this rare opportunity, NOAA and CIRES scientists from CSL and researchers from the University of Houston traveled to La Réunion, an island in the Indian Ocean, to make in situ measurements deployed by balloons that can rise to 30 km. Observations were made approximately a week after the eruption, which is the time it took for the volcanic plume to travel westward ~8000 miles from the volcano location to La Réunion, where balloon launches occurred at the high altitude Maïdo Atmospheric Observatory. In situ measurements included SO₂, H₂O, O₃ and aerosol particle size distributions. In this seminar I will discuss the campaign logistics and preliminary analysis of the aerosol, ozone and water vapor measurements. Although the SO₂ injection to the stratosphere was not extremely large, the water vapor perturbation was unprecedented, and it remains to be seen what the longer term impacts on stratospheric ozone will be.