2023 Workshop: Hunga Tonga-Hunga Ha'apai: Reflections on Efforts, Findings, and Challenges 1.5 Years Later Since the Eruption

Long title
Hunga Tonga-Hunga Ha'apai: Reflections on Efforts, Findings, and Challenges 1.5 Years Later After the Eruption
Conveners
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Description

The activity of the Hunga Tonga–Hunga Ha‘apai volcano on the 15th of January, 2022 resulted in a series of large-magnitude eruptions, which generated a broad range of mechanical waves in the atmosphere. The event provided a rare opportunity to investigate coupled solid-ocean-atmosphere processes driven by generated waves globally over several days. The ability to interpret measured fluctuations despite their complexity suggests opportunities and needs for future observations and modeling efforts. We invite presentations related to the latest observation-guided and modeling-based efforts that contribute to a better understanding of the geophysical processes driven by this eruption.

Agenda

Virtual Workshop Component:

Meeting ID: 931 3258 3450
Password: 046059
Link:
https://erau.zoom.us/j/93132583450?pwd=ZDBXcDYyem96VG54ZG90R2tMT2tEdz09

13:30-13:40 (In Person):

S.-R. Zhang - Some unpublished TID results associated with the Tonga eruption

13:40-13:50 (In Person):

E. Rojas, J.P. Velasquez, P. Reyes, P. Hitchcock - Estimating neutral perturbations caused by the Tonga eruption: Approach and preliminary results

13:50-14:00 (Online):

F.L. Poblet, J.L. Chau, J.F. Conte, J. Vierinen, J. Suclupe, A. Liu, R.R. Rodriguez, J. M. Urco - Extreme horizontal wind perturbations in the mesosphere and lower thermosphere over South America associated with the 2022 Hunga eruption

14:00-14:10 (In Person):

W. Yu, R. Garcia, J. Yue*, X. Wang, A. Smith, W. Randel, Z. Qiao, L. Harvey, Yu. Zhu, S. Tilmes, M. Mlynczak, J. Russell - Mesospheric temperature and circulation response to the 2022 HTHH volcanic eruption

14:10-14:20 (In Person):

S. Aryal, Q. Gan, S. Evans, S. Vadas, H. Liu, F. Laskar, D. Karan, X. Cai, W. Wang, B. McClintock and R. Eastes - Observation of thermospheric temperature perturbation induced by the Tonga volcano: GOLD observation and comparison with models.

14:20-14:30 (In Person):

L.C. Gasque, B.J. Harding, T.J. Immel, Y.-J. J. Wu, C.C. Triplett - The case of the missing ionosphere: Investigating the ionospheric hole following the 2022 Tonga volcanic eruption

14:30-14:40 (In Person):

R.B. Cosgrove - An electromagnetic calculation of electric field mapping that finds very unexpected results

14:40-14:50 (In Person):

D. Singh, D. Pallamraju, A. Amores - Small-scale magnetic field perturbations observed by the SWARM satellite during the Tonga volcanic eruption

14:50-15:00 (Online):

L. Paxton - confirmed

15:00-15:10 (In Person):

H.-L. Liu, W. Wang, J. D. Huba, P. H. Lauritzen, F. Vitt - Atmospheric and Ionospheric Responses to Hunga-Tonga Volcano Eruption Simulated by WACCM-X

15:10-15:20 (In Person):

S.L. Vadas, D.R. Themens, C.A.O.B. Figueiredo, J. D. Huba, E. Becker, N. Hindley, S. Mrak, B. Harding, C. Gasque, I. Galkin and K. Bossert - Traveling ionospheric disturbances induced by the secondary gravity waves from the Tonga eruption: Modeling with MESORAC-HIAMCM-SAMI3 and comparison with GPS/TEC, ionosonde data and MIGHTI data

15:20-15:30 (In Person):

X. Lu, H. Wu, W. Wang and H.-L. Liu - Preconditioning Effects of A Geomagnetic Storm on Gravity Waves Generated by Tonga Volcano Eruption Using Nested-Grid TIEGCM

Justification

The CEDAR community demonstrates a marked interest in understanding the atmospheric effects of the 15 Jan. 2022 Hunga Tonga-Hunga Ha'apai volcanic eruption, as is clear from the abundance of studies which have emerged in the past year. At the same time, the broader picture of natural hazard-related dynamics, and especially how they couple with the upper atmosphere, is still not fully understood or quantified. While current theories attempt to explain the mechanisms that result in the observed fluctuations and long-lived phenomena, additional work is necessary to verify and quantify the theories. This workshop will provide an opportunity to share and discuss the latest results and efforts towards understanding this event, potentially opening new challenges and opportunities in future investigations of the impact of natural hazards on Earth's geophysical system. These efforts are highlighted in CEDAR Strategic Thrusts 1, 4, and 5.

Related to CEDAR Science Thrusts:
Develop observational and instrumentation strategies for geospace system studies
Fuse the knowledge base across disciplines in the geosciences
Workshop format
Short Presentations

Keywords
Natural Hazards, Atmospheric waves, Lower-Upper Atmosphere-Ionosphere Coupling
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