2024 Workshop: NASA Peru Sounding Rocket Campaign Planning

Long title
NASA Peru Sounding Rocket Campaign (Cielo) Planning
Conveners
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Description

NASA is soliciting proposals for sounding rocket missions to be conducted in a campaign (called ‘Cielo’ or ‘sky’ in Spanish) from the Punta Lobos rocket range near Lima, Peru. The campaign is nominally scheduled for the spring or fall of 2028. The purpose of the campaign is to investigate important, contemporary problems in equatorial aeronomy, space physics, and space weather. NASA carried out two highly successful campaigns from the Punta Lobos rocket range in 1975 and 1983. This new campaign, to be carried out at the existing rocket range, represents an opportunity to investigate outstanding, critical problems in equatorial aeronomy using state-of -the-art spacecraft and ground-based instrumentation. The site was chosen primarily due to its proximity to both the magnetic equator and the Jicamarca Radio Observatory with supporting clusters of instruments deployed in the region. Furthermore, Jicamarca is undergoing a series of upgrades that will enable it to support a number of new kinds of experiments and observations to complement the space-borne measurements.

The purpose of this workshop is to inform the community about opportunities to participate in the rocket campaign and associated ground-based research. NASA anticipates the launch of 10–14 rockets. A number of colleagues from U.S. and international institutions will be taking part directly in the rocket flights or indirectly through the deployment of complementary instrumentation. Provisions for student projects and training are anticipated to be an important of the NASA campaign. Examples of scientific research topics that may be investigated include, but are not be limited to, mesospheric waves and turbulence, the equatorial electrojet, 150-km echoes, valley-region echoes, dynamo theory and equatorial electrodynamics, the

midlatitude anomaly, equatorial spread-F, and the topside ionosphere. A whitepaper describing motivations and background for the upcoming campaign is available at https://rscience.gsfc.nasa.gov/keydocs/PeruWhitePaperMarch31_2023.pdf.

This workshop represents an opportunity for potential PIs and co-I's to learn about the research opportunities afforded by this exciting rocket/radar campaign, to informally outline research goals and methods, and to see how the various research topics and ideas might fit within the larger campaign landscape. It will also be a vehicle for learning how rocket missions can be supported by Jicamarca and other research assets in the Peruvian sector. Finally, it presents a venue for proposing and planning synergistic experimental, theoretical, and computational research projects thematically related to the campaign including student projects.

Agenda

Dave Hysell: intro
Max King: background, Wallops perspective (20 min.)
Jorge Samanes: CONIDA status and planning (20 min.)
Robert Pfaff: historical background, launch azimuths (20 min.)
Danny Scipion: JRO and other ground-based support (20 min.)
Jorge Chau: IAP support/collaboration (20 min.)
All: prospective missions, instruments, and support (20 min.)

Justification

Despite many years of research, numerous, important questions pertaining to equatorial aeronomy and space physics remain unanswered, yet continue to command our attention. Many of these questions pertain to coupling between atmospheric strata and/or between neutral and charged species in the upper atmosphere and ionosphere. An opportunity to pursue many of these questions through a series of sounding rocket missions backed by a recently upgraded Jicamarca observatory and an extensive regional network of instruments is presenting itself. The upcoming NASA rocket campaign exemplifies the kind of inter-agency cooperation and ground- and space-based data fusion that are hallmarks of NSF's CEDAR program.

Related to CEDAR Science Thrusts:
Explore exchange processes at boundaries and transitions in geospace
Develop observational and instrumentation strategies for geospace system studies
Fuse the knowledge base across disciplines in the geosciences

Include a virtual component?

No

Keywords

equatorial aeronomy, sounding rockets, instrumentation, campaigns

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