



Physical Research Laboratory, Ahmedabad

Colloquium 20_15

- Speaker:** Prof. Subramanian Gurubaran
Professor, Indian Institute of Geomagnetism, Navi Mumbai
- Title:** "Internal Bores in the Mesosphere: A manifestation of Atmospheric Gravity Waves."
- Date and Time:** Wednesday, 23 December 2020, 16:00 – 17:00 hrs
- YouTube Link:** <https://www.youtube.com/watch?v=8FcYG8jJfik&feature=youtu.be>

Abstract

A plethora of wave phenomena occurs in the Earth's atmosphere encompassing a multitude of spatial and temporal scales. Among their several manifestations in the upper layers of the atmosphere, a well-marked dynamical feature is the internal bore. A spectacular wave feature in the heights between 85 and 100 km involving an altitude dependent bright or dark wavefront followed by phase-locked crests and troughs was first reported by Mike Taylor and his coworkers in 1995 through all-sky airglow imaging observations that was later interpreted as a mesospheric bore. Since then, a number of ground and space-based investigations of this intriguing wave dynamical feature have been reported. We have analogs for the mesospheric bores in other atmospheric regions like the morning glory and tropospheric bores and also in channel bores that have been explained by the hydraulic jump theory. The mesospheric bores are occasionally observed in airglow emissions as a steep front followed by undulations or a turbulent regime behind. These bores have their origin in stable atmospheric layers characterized by temperature inversion (thermal duct) or favourable wind systems (Doppler duct). Atmospheric gravity waves propagating through those ducts can undergo amplitude steepening, resulting in bores with phase-locked crests and troughs behind (undular bore). The damping of waves behind the fronts can lead to turbulence (turbulent bore) on certain occasions. Bore-like fronts are also seen in noctilucent clouds at high altitudes. This talk will introduce this exciting subject of internal bores in the mesosphere and present some of the fascinating observational results obtained from different platforms in the recent past. The challenges in understanding the mechanisms underlying this phenomenon essentially lie in the sparsity of observational knowledge about the environmental or the background atmospheric parameters. This talk will highlight those challenges as well.

The Speaker

Prof. S. Gurubaran did his Masters (1987) in Physics from Madras Christian College (Autonomous) and Ph.D. (1993) from the Physical Research Laboratory, Ahmedabad, and did his post-doctoral fellowship also at PRL during 1993-1995. He had been a Scientific Visitor at the High Altitude Observatory, National Center for Atmospheric Research, Boulder, CO, USA (September 2002 – February 2003) and an Associate Visiting Professor, Research Institute for Sustainable Humanosphere, Kyoto University, Japan (August 2004-March 2005). His fields of research interest are Dynamical coupling of atmospheric regions and Electrodynamics of equatorial ionosphere. He has more than 100 peer-reviewed research papers to his credit. He was elected as the Chairman of Interdivisional Commission for Developing Countries (ICDC), a part of International Association for Geomagnetism and Aeronomy (IAGA), and served during 2015-2019. He is the recipient of the PRL Award in Earth and Planetary Sciences in 2005. So far he has supervised 10 Ph.D scholars. He is currently working as a Professor at the Indian Institute of Geomagnetism, Navi Mumbai, India.

ALL ARE WELCOME

