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Dr. Paulo P. Batista é bacharel em Física pela Universidade Federal de Goiás (1972), mestre em Geofísica Espacial pelo Instituto Nacional de Pesquisas Espaciais (1976), doutor em Geofísica Espacial pelo Instituto Nacional de Pesquisas Espaciais (1983) e Pós-Doutorado pela Boston University (USA) em 1987. Atualmente é pesquisador titular do Instituto Nacional de Pesquisas Espaciais. Tem larga experiência na área de Geociências, com ênfase em Geofísica da Alta Atmosfera, atuando principalmente nos seguintes temas: Dinâmica da região da Mesosfera e Baixa Termosfera, Marés Atmosféricas, Ondas Planetárias e ondas de Gravidade com a utilização de técnicas de Aeroluminescência Atmosférica, Radar de Laser (Lidar), Radares Meteóricos e Satélites. (Fonte: Curriculo Lattes)

Título da Palestra: "Middle Atmosphere research at INPE: History, present situation, and future"

Palestrante Convidado da Sessão Física e Química da Atmosfera Neutra: Quarta-feira, 24 de março de 2021, das 14h00 às 14h40

Resumo: The National Institute for space research (INPE) develops since it was created in 1961, researchers in the neutral and ionized atmosphere from ground to space limits. The region between ~ 20 and 110 km of altitude, called "Middle Atmosphere", and especially the part between ~ 80 and 110 km called "Upper Mesosphere and lower Thermosphere (MLT)" displays a wide variety of chemical and physical phenomena. This region of the atmosphere is not easily accessible by conventional in situ measurements for being too high, or by satellites for being too low. However, there are several ways to measure remotely their chemical and physical properties. This facility for measurements arises from properties and natural phenomena that occur on it. The electromagnetic wave scattering, on several spectral bands, by neutral and ionized molecules and atoms can be measured from ground-based radars. In the MLT region occurs the ablation of a number of meteors coming from space, and these meteors deposit many metal elements (Fe, Mg, Na, K, etc.) that modify the region chemistry and act as local movement tracers. Passive methods can also be used by measuring the light emitted by exited atoms and molecules (Airglow) that concentrate into layers in this region. INPE has started neutral atmosphere research by using a Light detection and Ranging (Lidar) in 1968, initially measuring the aerosol load present in the atmosphere at around 20 km altitude. After 1972 the same Lidar started to measure the Sodium density in the MLT with all the instrumental devices developed at INPE. After 1999 the research on the MLT dynamics had a great impulse with the installation of a Meteor Radar at Cachoeira Paulista, SP. Radars in the equatorial region (São João do Cariri, PB), and in middle-low latitude (Santa Maria, RS) were deployed in 2004. With the two instruments and added by Airglow measurements many works were published aiming the understanding of the Atmospheric Waves (Planetary Waves, Tides and Internal Gravity Waves) and its role in the coupling among several atmospheric layers. The original Lidar, which was used also to measure the mesopause temperature, went broken on October 2016, but another Lidar with two channels aimed to measure

simultaneously the Sodium and Potassium started to work on November 2016 due to a cooperation with China/NSSC/CAS through the China-Brazil Joint laboratory for Space Weather. In this presentation, I will talk about the history of the instruments and, will give the main scientific results obtained in the past and nowadays. We will present the future possibilities, mainly those that will come from the collaboration with China, including the deployment of an Advanced Lidar able to measure density, temperature, and winds from the ground to the thermosphere. These systems, the present and the future have great capacity to aggregate researchers and generate research opportunities to new Master and Doctors for many years ahead.