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Case study of a mesospheric inversion over Maïdo observatory through a multi-instrumental observation.

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Mesospheric temperature inversions are subject to investigations due to the links with multiscale dynamics such as planetary wave and gravity waves. Knowing the impact on climatological inversions also requires understanding the phenomena occurring before, through, and after a mesospheric inversion. We use data obtained during a measurement campaign over Maïdo observatory in La Réunion Island and focus on a specific event occurring in the night between the 9th and the 10th of October 2017. Among the several observations available, LIDAR measurements provided vertical profiles of temperature and gravity waves potential energy completed by high vertical resolution radiosoundings. The airglow layer observed by an InGaAs camera shows the evolution of gravity wave structures at about 87 km between 0.9 and 1.7 μm . Gravity wave parameters such as horizontal wavelengths or intensity emission variations are extracted, along with potential energy compared with LIDAR data. We use atmospheric models (ERA5, WACCM, WRF) and specific tools (NEMO, GROGRAT) to add supplementary information about the night selected. We present here the first results related to the gravity waves and energy exchanges in the frame of the temperature inversion.