



Gravity wave characteristics in the middle atmosphere at Palma de Mallorca due to a Mediterranean tropical storm and fronts

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Atmospheric waves, especially gravity waves, which are radiated from convective sources like an extratropical cyclone, are investigated to serve as a proxy for the changing energy content of the storm itself. This information, if available, regularly is of special importance for improving storm track and intensity forecast.

During a measuring campaign which was carried out at Mallorca as cooperation between AEMET and DLR in 2011 (September to December), 143 radio soundings (day and night) providing beneath others vertical temperature profiles were performed. Additionally, operational nightly mesopause temperature measurements with a time resolution of about 15s which were deduced by an infrared spectrometer (GRIPS) are available for Mallorca during the campaign period.

From these observations gravity wave activity in the stratosphere and mesopause related to significant weather conditions is derived and compared. A Mediterranean tropical storm in November 2011 as well as a strong cold front in December 2011 is used to discuss these results. Especially gravity wave momentum fluxes are deduced and investigated to point out the difference between steady and severe weather. They showed an increase of more than four times during convective events in comparison to a quiet period.