



Coupling between the lower and upper atmosphere during thunderstorms

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We present observations of gravity waves produced by thunderstorms in France and in Africa performed in the frame of the ARISE project by using infrasound technology. The wave amplitudes reach 150 Pa and periods vary from few tens of minutes up to few hours during the thunderstorm evolution. The thunderstorm structure can be determined by using meteorological radars, satellites and lightning maps. Activity in the troposphere is strongly related to the thunderstorm presence and vanishes when the thunderstorm moves away. Comparison with radar observations shows that gravity waves originate from different convection cells moving over the station. Thunderstorm systems are observed in Ivory Coast (Africa) over much larger period of time than in France. The thunderstorm activity appears to be the major source of gravity waves in these regions. Models show that the impact in the stratosphere and mesosphere can be significant. It is concluded that such observations are very efficient to precisely characterize convection cells and dynamical motions at the origin of gravity waves which are currently observed in the upper atmosphere and ionosphere.