



## **LINET lightning observations in different climate regimes**

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LINET (Lightning detection NETWORK) is a system of sensors for lightning detection operating at VLF/LF range. The system has been designed by the University of Munich and a deployable network is operated by DLR as part of several international field campaigns.

This paper presents a first comparison of the results from thunderstorm observations in different climate regimes and focuses on the interpretation of the data with respect to the storm dynamical and microphysical storm structure as derived from polarimetric radar measurements.

In 2005 three major field measurement programs were carried out with LINET participation:

- the EU TROCCINOX (Tropical convection, cirrus and nitrogen oxides experiment) campaign in Brazil during Feb 05
- the summer field phase in Southern Germany with POLDIRAD - LINET intercomparison using a high-density lightning network
- the EU SCOUT-O3 (Stratospheric-Climate Links with Emphasis on the Upper Troposphere and Lower Stratosphere) and TWP-ICE (Tropical Warm Pool - International Cloud Experiment) campaign during Nov 05 - Feb 06 in Darwin/Australia

Lightning properties like frequency of occurrence, IC-CG ratio, amplitudes or the temporal and spatial structures are compared for the three different regions of the world. A special feature which can be inferred with the LINET system is the height of the lightning sources. Especially the Australian storms show high altitude IC events. Many

storms show relatively sharp transitions from the IC-region in the upper cold cloud parts to the IC-free lower (below) storm levels close to the ground. The vertical flash distributions have implications for the distribution of lightning produced NO<sub>x</sub> (LNO<sub>x</sub>) which was in the focus of TROCCINOX.

Storm structures as derived from the polarimetric radar observations have shown that IC-lightning often is structured in cores similar to the cores of convective cells. It typically starts to develop during cell intensification thus weaker storms (even though they might have appreciable dimensions) tend to have low lightning frequency. Storm intensity can also be measured by graupel or hail mass which relates to IC flash rates.