Geophysical Research Abstracts
Vol. 12, EGU2010-5673, 2010
EGU General Assembly 2010

Lightning-Integrated Water Vapor relationships in the South Pacific

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Lightning can be a tracer of vigourous convections that can be measured with relative ease from satellite and/or from ground station networks especially over huge oceanic surfaces like the Pacific ocean. Therefore, lightning activity can provide a valuable means of validating the performance of model convective schemes. Indeed, lightning occurs where vigourous convective drafts lift large particules above the 0C isotherm, although that correlation may be modulated by other parameters. Various relationships have been published linking lightning and properties of convective systems. In a previous work, we have shown that the location of the maximum lightning activity distribution (from World Wide Lightning Location network) as a function of latitude, and modeled by a polynomial function, leads to a curve comparable with the monthly mean position of the South Pacific Convergence Zone. That band of cloudiness is assumed to be the main source of lightning in the South Pacific. Nevertheless, the maximum lightning activity is correlated not to the maximum but to moderate rainfall rates. Departures between both parameters occur when the monthly position of the SPCZ is clearly different from its mean position calculated over nearly 40 years. To learn more about that correlation we are taking advantage of the recent development of the GPS applications which allows the precipitable water content in the troposphere to be estimated in a vertical integrated form (Integrated Water Vapour). The IWV temporal series recorded over Tahiti are compared to the lightning activity, taking into account the type of lightning discharge (Cloud to Ground or Intra Cloud) distinguished thanks to the radiated electric field measurements.