



## **Experiences of forecasting tropical thunderstorms in Sri Lanka with local and global numerical weather prediction models**

Juha Kilpinen (1), Paavo Korpela (1), Matias Brockmann (1), Sami Niemelä (1), Shiromani Jayawardena (2), Malith Fernando (2), and Antti Mäkelä (1)

(1) Finnish Meteorological Institute, Finland (antti.makela@fmi.fi), (2) Department of Meteorology, Sri Lanka

Sri Lanka is situated in the Indian Ocean between 5.9°-9.8°N 79.6°-81.9°E. The country experiences annually various natural hazards causing severe losses to the developing society. When considering atmospheric hazards, the most impact comes from the heavy precipitation and thunderstorm episodes; hundreds of people are annually killed or left without a home due to precipitation-related flooding and landslides as well as lightning. Therefore, the society would benefit largely if the forecasts of these hazardous events would be available and reliable enough.

In this work we have analysed the performance of two numerical weather prediction (NWP) models in the Sri Lanka region. Firstly, a Probability of Thunder (POT) index is developed from the ECMWF global operational data, indicating the probability for thunder within the coming few days ahead. Here, the POT is an ingredients-based index tailored from the available ECMWF output whereas conceptionally CAPE represents instability and moisture, and precipitation rate represents forcing. Secondly, high-resolution local NWP Harmonie was set as semi-operational for forecasting especially the amount of lightning and precipitation for +36 hours ahead; in Harmonie, the “lightning” output is an operational parameter as such. Outputs of both models are then compared against the actual observed lightning based on the Vaisala Global Lightning Dataset 360.

In this presentation, we show the performance of the ECMWF and Harmonie NWP systems from one year with respect to their capability of forecasting thunderstorms in Sri Lanka. Also, we discuss in general the local convective environment and the challenges of providing accurate thunderstorm forecasts in these regions.