



New early warning indices for monsoon onset and withdrawal in all regions based on cosmogenic radionuclide ^7Be

Lucrezia Terzi (1), Martin Kalinowski (2), and Michael Schoeppner (2)

(1) SCKCEN, Nuclear security, Vienna, Austria (lucreziaterzi@hotmail.com), (2) CTBTO

With 80 radionuclide detection systems worldwide, the International monitoring system (IMS) offers an unprecedented opportunity to use ^7Be as an aerosol tracer for global meteorological processes.

^7Be is a cosmogenic radionuclide and a vertical downward influx tracer that can be used as a new parameter for seasonal weather forecast and climate change.

With a 53-day half-life and due to its physical properties ^7Be is suitable to study large scale circulations such as Hadley and Ferrel cell dynamics.

The close relationship between Hadley-Ferrel cell convergence zone and Monsoons make ^7Be a reliable indicator for Monsoon onset and withdrawal forecast.

Cross correlations of ^7Be activity concentrations at different monitoring stations has the potential to serve as an early warning index for monsoon regions worldwide with over 30-day warning prior to monsoon onset and withdrawal.

^7Be timeseries indicate the trend of atmospheric cell shift. Therefore, ^7Be is a more reliable index than water content, as it is linked to the cause rather than the side effects of monsoon phenomena.

This study focuses on monsoon forecast accuracy versus early warning time and how much deviation improves from a multi-year fit.

Near-surface ^7Be activity concentrations may help address outstanding challenges in monsoon research by integrating a new perspective across the disciplines of environmental radiation monitoring and meteorology.