

EGU24-9454, updated on 20 May 2024

<https://doi.org/10.5194/egusphere-egu24-9454>

EGU General Assembly 2024

© Author(s) 2024. This work is distributed under the Creative Commons Attribution 4.0 License.



Trend and Variability in the Long-Term Relationship Between Eurasian Snow Cover and Indian Summer Monsoon Rainfall

Dr Pushpa Pandey¹, Dr Michael Kunz¹, Dr Suneet Dwivedi², and Dr Bhupendra Nath Goswami³

¹Karlsruhe Institute of Technology, Germany (michael.kunz@kit.edu)

²University of Allahabad, India (suneetdwivedi@gmail.com)

³Cotton University, India (bhupengoswami100@gmail.com)

The predictability of Indian Summer Monsoon Rainfall at any given time period depends on the strength of its relationship with predictable drivers like the El Nino–Southern Oscillation (ENSO) that are known to undergo significant epochal variations. While the relationship between Eurasian snow cover fraction and Indian Summer Monsoon Rainfall has also shown a similar epochal variability in recent decades, its stationarity on centennial or longer timescales remains unknown. In the present work two indices of snow cover fraction have been unraveled, on the basis of the observed relationship between the dominant modes of Indian Summer Monsoon Rainfall variability and snow cover fraction over a period of 115 years (1901–2015), that encapsulate its spatio-temporal variability. It has been observed that the relationship between the snow cover fraction indices and Indian Summer Monsoon rainfall have a statistically significant increasing trend with a weak multidecadal variability superimposed on it, making significant positive correlation between the two highly probable in the coming decades. With snow cover fraction driving the North Atlantic Oscillation (NAO) that subsequently drives the Indian Summer Monsoon Rainfall variability, it has been demonstrated that the NAO plays a pivotal role in modulating the teleconnection between the Indian Summer Monsoon Rainfall and snow cover fraction on a multidecadal time scale.

Keywords: El Nino–Southern Oscillation, North Atlantic Oscillation