

## Accepted Manuscript

Research papers

Controls on water vapor isotopes over roorkee, india: impact of convective activities and depression systems

P. Saranya, Gopal Krishan, M.S. Rao, Sudhir Kumar, Bhishm Kumar

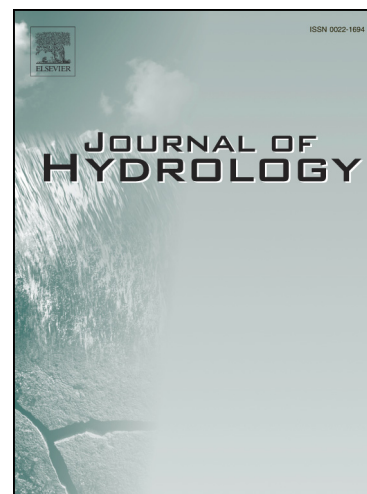
PII: S0022-1694(17)30889-2  
DOI: <https://doi.org/10.1016/j.jhydrol.2017.12.061>  
Reference: HYDROL 22472

To appear in: *Journal of Hydrology*

Received Date: 26 May 2017  
Revised Date: 20 December 2017  
Accepted Date: 23 December 2017

Please cite this article as: Saranya, P., Krishan, G., Rao, M.S., Kumar, S., Kumar, B., Controls on water vapor isotopes over roorkee, india: impact of convective activities and depression systems, *Journal of Hydrology* (2017), doi: <https://doi.org/10.1016/j.jhydrol.2017.12.061>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



## CONTROLS ON WATER VAPOR ISOTOPES OVER ROORKEE, INDIA: IMPACT OF CONVECTIVE ACTIVITIES AND DEPRESSION SYSTEMS

Saranya. P<sup>1</sup>, Gopal Krishan<sup>2</sup>, M.S. Rao<sup>2</sup>, Sudhir Kumar<sup>2</sup>, Bhisim Kumar<sup>2</sup>

1. National Centre for Earth Science Studies, Akkulam-695011, Kerala
2. National Institute of Hydrology, Roorkee-247 667, Uttarakhand

### Abstract

The study evaluates the water vapor isotopic compositions and its controls with special reference to Indian Summer Monsoon (ISM) season at Roorkee, India. Precipitation is usually a discrete event spatially and temporally in this part of the country, therefore, the information provided is limited, while, the vapors have all time availability and have a significant contribution in the hydrological cycle locally or over a regional scale. Hence for understanding the processes altering the various sources, its isotopic signatures were studied. The Isotope Water Vapour Line (Iso Val) was drawn together with the Global Meteoric Water Line (GMWL) and the best fit line was  $\delta D = 5.42 * \delta^{18}O + 27.86$ . The precipitation samples were also collected during the study period and were best fitted with  $\delta D = 8.20(\pm 0.18) * \delta^{18}O + 9.04(\pm 1.16)$  in the Local Meteoric Water Line (LMWL). From the back trajectory analysis of respective vapor samples, it is unambiguous that three major sources viz; local vapor, western disturbance and monsoon vapor are controlling the fate of moisture over Roorkee. The d-excess in ground-level vapor (GLV) reveals the supply of recycled moisture from continental water bodies and evapo-transpiration as additional moisture sources to the study area. The intensive depletion in isotopic ratios was associated with the large-scale convective activity and low-pressure/cyclonic/depression systems formed over Bay of Bengal.

Key words: d-excess, moisture source, convection, cyclone, relative humidity

Download English Version:

<https://daneshyari.com/en/article/8895062>

Download Persian Version:

<https://daneshyari.com/article/8895062>

[Daneshyari.com](https://daneshyari.com)