

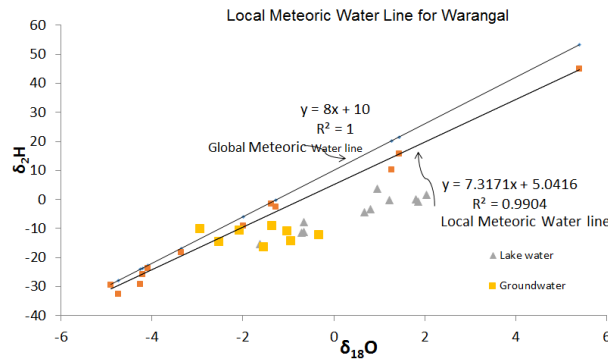
# A STUDY ON ISOTOPE HYDROLOGY OF WARANGAL, ANDHRA PRADESH

## Abstract

Isotopic composition of monthly precipitation samples from Warangal, a semi arid region across Southern India was studied for a period of 12 months. During the study period, the region received a average rainfall of 900 mm. The stable isotope ( $^{18}\text{O}$ ) values varied from -4.9 ‰ to 2.4 ‰ for the precipitation samples throughout the year. The d-excess of precipitation in Warangal revealed that the precipitation in the region undergoes significant modification through secondary evaporation during its fall. The Local meteoric water line for Warangal city is developed. The stable isotope composition of precipitation at Warangal showed significant variation from global trend. These differences are attributed to the higher mean sea elevation of the area as well as climatic conditions.

## METHODOLOGY

The rainwater samples for the study area were collected following the norms suggested by IAEA. The samples are collected in a 60 ml, Polyethylene bottle directly from the source and clearly labeled with all details. It is made sure the bottles are tightly capped. During sampling, storage and transportation to the laboratory, care is taken to avoid evaporation of the sample. The analyses of the isotope composition are carried out in the Isotope hydrology laboratory of CWRDM which has funded this research.



**Virtual Poster** The local meteoric water line for Warangal city, which is located on the Deccan plateau, in the peninsular India, show slight deviation from the GMWL owing to its isotopic modification through secondary evaporation during its precipitation. The isotope signature of Waddepally Lake suggests that the investigated lakes were not only sourced by direct precipitation and surface runoff, but also from more evaporated water reservoir.

Isotope studies have proved to be useful as a reconnaissance tool in hydrogeological data scarce environments. In the present research the applications of

environmental stable isotopes ( $^{18}\text{O}$  and  $^2\text{H}$ ) are considered to study the scenario of lake and groundwater interaction.

Similar studies can be taken up in other urban areas in India. The issues related to groundwater dating (age) using isotopes, groundwater contamination, lake sedimentation and the applications of other environmental and radio isotopes can be a future scope of research work.

## CONCLUSIONS

The stable isotopic composition of precipitation of Warangal is discussed.

- The isotopic composition of precipitation at Warangal undergoes significant modification due to secondary evaporation during its fall.
- Due to secondary evaporation, the isotopic composition of precipitation at Warangal especially during the pre-monsoon rains is not representing its actual isotopic signature but showing a lower depletion than its actual value.
- Most of the precipitation at Warangal derives moisture from continental sources.
- The rainout effect and the addition of continental vapour cause the isotopic composition of precipitation at Warangal to show comparatively depleted isotopic signatures during south west monsoon season.
- The cyclonic nature of rain, distance of the station from moisture source region and the possible contribution from continental sources is the reason for highly depleted isotopic composition of precipitation at Warangal during the post monsoon season.