IAO HANLE: A PROMISING ASTRONOMICAL OBSERVATORY

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Indian Astronomical Observatory located at Hanle near Leh in Ladakh. Photo: iiap.res.in

The Indian Astronomical Observatory (IAO) located at Hanle near Leh in Ladakh is becoming one of the globally promising observatory sites, according to a recent study.

This is due to its advantages of more clear nights, minimal light pollution, background aerosol concentration, extremely dry atmospheric condition and uninterrupted monsoon, the Department of Science and Technology said.

Researchers from India and their collaborators carried out a detailed study of the night time cloud cover fraction over eight high altitude observatories, including three in India, the DST said.

The researchers used reanalysis data combined from assimilation and observation extending over 41 years, along with 21 years of data from satellites. The study classified the quality of observable nights for different astronomical usages like photometry and spectroscopy on a daily basis.

They analysed datasets for the Indian Astronomical Observatory (IAO) in Hanle and Merak (Ladakh), and Devasthal (Nainital) in India, Ali Observatory in the Tibet Autonomous Region in China, South African Large Telescope in South Africa, University of Tokyo Atacama Observatory and Paranal in Chile, and the National Astronomical Observatory in Mexico.

The team found that the Hanle site which is as dry as Atacama Desert in Chile and much drier than Devasthal and has around 270 clear nights in a year and is also one of the emerging sites for infrared and submillimetre optical astronomy. This is because water vapour absorbs electromagnetic signals and reduces their strength, the DST said in a statement. The research led by Dr. Shantikumar Singh Ningombam of Indian Institute of Astrophysics (IIA), Bengaluru, and scientists from Aryabhatta Research Institute of Observational Sciences (ARIES) in Nainital, a DST institute and collaborators from St. Joseph's College, Bengaluru, and the National Institute of Meteorological Sciences, South Korea, University of Colorado and Chemical Sciences Laboratory, NOAA, U.S. has been published in the *Monthly Notices for Royal Astronomical Society*.

They found Paranal, located in a high-altitude desert in Chile, to be the best site in terms of clear skies with around 87% of clear nights in a year. IAO Hanle, and Ali observatories, which are located around 80 km from each other, are similar to each other in terms of clear night skies.

They found that Devasthal has a slightly larger number of clear nights compared to the other sites in the subcontinent but are affected by monsoons for about three months in a year. However, night observations at IAO Hanle from 2m-Himalayan Chandra Telescope (HCT) are possible throughout the year without any interruption due to monsoon.

Due to the advantages of more clear nights, minimal light pollution, background aerosol concentration, extremely dry atmospheric conditions, and uninterrupted monsoon, this region is becoming one of the promising sites globally for the next generation of astronomical observatories, it said.

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