

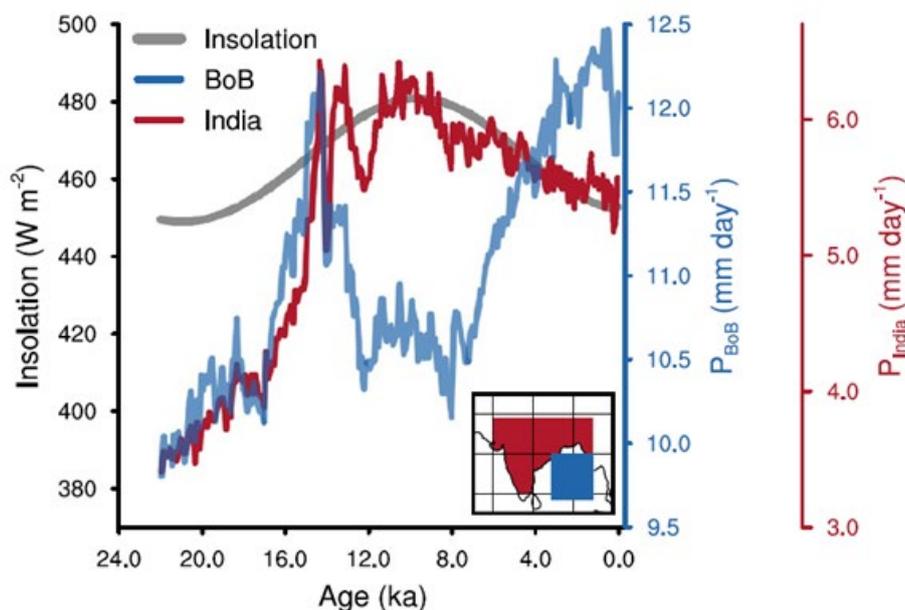
DIFFERENCE BETWEEN THE MONSOON OVER LAND AND OCEAN

Before the advent of the satellite era, scientists assumed that monsoon rainfall is higher over land because the land became hotter than the ocean during summer. The satellite data has shown, however, that the highest rainfall in the Indian region occur over the Bay of Bengal. The seasonal variation of rainfall over the ocean is similar to that over land and hence ocean regions can also be classified as monsoonal regions. The amount of solar radiation falling over India and Bay of Bengal are similar, but the rainfall is higher over Bay of Bengal. This is because the atmosphere above the ocean contain more water vapor and there is additional energy supply of energy from the ocean surface in the form latent heat flux.

After the earth emerged from the last ice age 18,000 years ago, the rainfall over Indian land and Bay of Bengal increased rapidly because a warmer atmosphere increased the amount o water vapor in the atmosphere. Around 10,000 years ago, the solar radiation

incident over the Indian region began to decline in summer on account of changes in the earth-sun geometry. This decreased the monsoon rainfall over India but increased the rainfall over the Bay of Bengal(see figure). The different response of Land and ocean to the changes in incoming solar radiation has puzzled scientists for a long time. In a recent paper, Chetankumar et al.(2020) have shown that the increase in rainfall over the Bay of Bengal was on account of an increase in the surface wind speed. The increase in surface wind speed over Bay of Bengal was shown to be related to increase in rainfall over the middle east and equatorial Indian ocean

Reference: Different precipitation response over land and ocean to orbital and greenhouse gas forcing, Chetankumar Jalihal, Jayaraman Srinivasan & Arindam Chakraborty, Scientific Reports | (2020) 10:11891 | <https://doi.org/10.1038/s41598-020-68346-y>.



Variation of summer rainfall in India and Bay of Bengal during the past 22,000 years