

The strange effect of the Moon on mangrove forests

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The Moon ‘wobble’ is a fluctuation in its gravitational pull that influences tidal activity.



The moon plays an important role when it comes to regulating the Earth’s oceans. Its gravitational pull forms tides that maintain the health of the oceans, coastal areas and biodiversity.

In a new [study](#) published in *Science Advances*, scientists have found that the oscillation of the moon’s orbit or ‘moon wobble’ has a significant impact on the mangrove canopy cover of the world.

half of this cycle, Earth's regular tides are suppressed while the other half produces amplified tidal activity.

Now, the study has found that these long-phase tidal cycles play an important role in the regulation of tidal wetland ecosystems— such as the growth of mangrove forests.

Mangrove forests are typically located between land and sea. Areas with higher tidal amplitude combined with smooth topography such as gentle-sloping mudflats are ideal for the growth of these salt-tolerant trees, said Dr K. Kathiresan, a professor of marine biology at Annamalai University, Chennai.

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Apart from Australia, where the study was conducted, mangroves can be found in India, Indonesia, Central America, Vietnam, Thailand and the Philippines.

Scientists from Macquarie University analysed high-resolution satellite images of the mangrove canopy cover and extent across the Australian continent over a period of 33 years from 1987 to 2020. They found that the mangrove canopy cover fluctuated at an interval of about 18 years.

The lead scientist of the study, Dr. Neil Saintilan, found a strong link between the fluctuations of the mangrove canopy cover and the lunar wobble.

Dr. Saintilan described the findings as surprising to *The Hindu* in an email, “We were not sure the strength of the lunar cycle on tide range would be large enough to have an influence on mangrove growth, but there was a very clear 18-year cycle in mangrove growth patterns which lined up perfectly with the lunar “nodal” cycle.”

The study noted three main factors that supported their theory. The shifting of mangrove canopy cover in coastlines across Australia experiencing two tidal patterns—semi-diurnal or two tides daily and diurnal or one tide daily—during the phases of the 18.61 year cycle.

The oscillation in the canopy cover was noted even taking into account other environmental factors such as the El Niño, low rainfall, reduced freshwater flow and high temperature during the period of the study. The wobble is an important control in those areas with large tides and pronounced dry seasons, said Dr Saintilan.

Recent studies on the rhythm of the lunar wobble have shown that it is heading towards a period where tides are amplified, resulting in an overall rise in sea level. Consequently, studies have predicted that by the mid-2030s, the lunar cycle will cause a dramatic increase in the

number of floods. Compounded with the effects of climate change, a drastic rise in sea level seems inevitable, with increasing instances of high-tide floods.

As natural sequesters of carbon, mangroves can play an important role in the coming decades.

“Mangroves are potent carbon sites with 4-5 times greater efficiency than terrestrial forests,” said Dr K. Kathiresan. Emphasising the importance of mangroves for carbon sequestration, he said, “It is promising to establish carbon credit benefit sharing.”

Dr. Saintilan said that using the ebb and flow of the mangrove canopy cover, as influenced by the tides, assessment of the carbon sequestration capacity of these trees, as well as efforts to conserve their ecosystem during stressful times such as drought and rapid sea-level rise should be considered

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