

Earthshine reflects Earth's oceans and continents from the dark side of the moon

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Researchers from the University of Melbourne and Princeton University have shown for the first time that the difference in reflection of light from the Earth's land masses and oceans can be seen on the dark side of the moon, a phenomenon known as earthshine.

The paper will be published this week, in the international journal *Astrobiology*.

Sally Langford from the University of Melbourne's School of Physics who conducted the study as part of her PhD, says that the brightness of the reflected earthshine varied as the [Earth](#) rotated, revealing the difference between the intense mirror-like reflections of the ocean compared to the dimmer land.

"In the future, astronomers hope to find planets like the Earth around other stars. However these planets will be too small to allow an image to be made of their surface," she said.

"We can use earthshine, together with our knowledge of the Earth's surface to help interpret the physical make up of new planets."

This is the first study in the world to use the [reflection](#) of the Earth to measure the effect of continents and oceans on the apparent brightness of a planet. Other studies have used a colour spectrum and [infrared sensors](#) to identify vegetation, or for climate monitoring.

The three year study involved taking images of the [Moon](#) to measure the earth's brightness as it rotated, allowing Ms Langford to detect the difference in signal from land and water.

Observations of the Moon were made from Mount Macedon in Victoria, for around three days each month when the Moon was rising or setting. The study was conducted so that in the evening, when the Moon was a waxing crescent, the reflected earthshine originated from Indian Ocean and Africa's east coast. In the morning, when the Moon was a waning crescent - it originated only from the Pacific Ocean.

"When we observe earthshine from the Moon in the early evening we see the bright reflection from the Indian Ocean, then as the Earth rotates the continent of Africa blocks this reflection, and the Moon becomes darker," Ms Langford said.

"If we find Earth sized planets and watch their brightness as they rotate, we will be able to assess properties like the existence of land and oceans."

Source: University of Melbourne

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