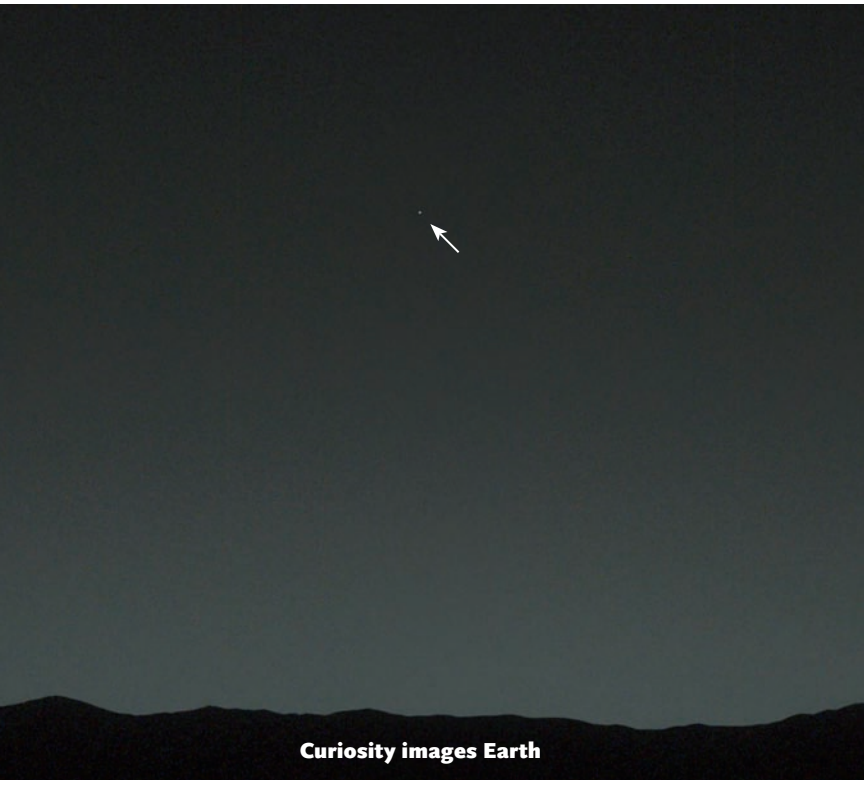
Looking Back in Wonder

Seeing Earth as a dot helps prepare us for the exoplanets.

In July 2007 I had a surreal experience — not just out of body, but truly out of planet. Because of a thought I had, something happened above Venus. No, I wasn't on drugs or having a psychotic episode. I was doing science.

I'm on the science team of ESA's Venus Express, a plucky spacecraft that is running low on fuel but still orbiting our sister world, studying a greenhouse climate run amok. By my second team meeting in Leiden in 2006, I was feeling secure enough in my role to propose something new. Would it be possible to turn the spacecraft around, momentarily diverting its gaze from Venus for a look back at Earth? Even if we wouldn't discover anything new about our home planet, what could we discern on a living world such as Earth when we examine it from afar?

In 2007 commands were sent from a radio dish in Spain instructing our little friend at Venus to turn homeward, taking pictures and spectra. Along with shifting colors as the world turned, we picked up whiffs of oxygen, methane, and ozone. My suave French colleague Jean-Loup Bertaux mused at our next team meeting, in Paris: "A congress of Venusians is declaring today that the solar system's third planet contains plenty of ozone in its atmosphere, enough to protect life (if any) at ground level. An audacious conclusion from Venusian scientists: maybe life has produced both oxygen and ozone!"



Curiosity images Earth

NASA / JPL-CALTECH / MSSS / TAMU

Earlier this year the world was given, by NASA's Curiosity rover, the evocative image of Earth as an "evening star" through the frigid, dusty dusk of Mars. We've now snapped long-distance views of Earth from the vicinity of Mercury, Venus, Mars, Jupiter, Saturn, and Neptune, and from the EPOXI spacecraft in interplanetary space. Unlike the classic, evocative views of Earth from the Moon or nearby spacecraft, which reveal the stunning complexity of our world, these distant views reduce us to a wandering point of light, as the visible planets were to our ancestors.

Our missions to other worlds are still risky and rare. So, compared to Earth science, with its firehouse of information, planetology is thirsty for any trickle of data. Paradoxically, this deprivation can help us see the big picture more clearly. If Earth's geological history is a convoluted epic novel, the rest of the solar system is a collection of short stories, each a parable with a different lesson for Earth. And now with the exoplanet revolution we've suddenly learned that our galaxy is brimming with such stories, a vast library we're poised to enter. In reducing Earth's complexity to a single pixel, we gain a hint of the challenge before us as we reach with our instruments across the much vaster distances to planets around other stars.

Comparative planetology is the science that gives us a cosmic perspective on our life-infused world and its current human-induced metamorphosis. We may, increasingly, be running this planet, but if we're going to do a decent job of it, we still have a lot to learn about how planets work. As a planetary explorer, I feel that we have begun this process of looking outward — and back — just in the nick of time. ✦

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