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EARTH

A glimpse into the future of space-born surveillance

New mapping by ESA satellites could track everything from natural disasters to illegal activity

Beyond what appears to be a landscape splotted with tie-dye, this image marks a turning point in ultra-precise Earth mapping.

It was taken by the European Space Agency's (ESA) Copernicus Sentinel-1C satellite, which launched in December 2024. Using radar, the satellite can map Earth's surface down to the millimetre, whatever the weather. To do this, it takes two or more images of the same location on different days to record

"The satellite will be used to map subsidence, glacier flow and more"

both the amplitude and phase information (the strength and location) of the radar pulse that's reflected back.

On 20 January and 1 February, Sentinel-1C captured the data that made this image of northern Chile, where the Atacama Desert meets the Pacific Ocean. In the bottom right of the image, the Zaldívar copper mine can be seen (the dark shapes are the pits).

The satellite will be used to map subsidence and glacier flow, as well as natural disasters like landslides and earthquakes. It's also primed to become an important part of marine surveillance, detecting oil spills and illegal fishing.

"We're thrilled with these first interferograms," ESA's Sentinel-1 Project Manager, Ramón Torres, said. "Quality is never an accident."

ESA/DLR MICROWAVES & RADAR INSTITUTE

