observations, it seems that most of the action lies in the southern part of the Salton Sea. Here, the sedimentary layers tilt downwards to the south along a hinge zone and become steeper in a southeasterly direction. Because the layers were flat when deposited, their current geometry suggests progressive deepening of the basin along its southern bounding fault. Using ages of the sedimentary layers determined from studies elsewhere in the basin[4] the researchers quantify the rate at which the basin deepens. This rate is roughly equal to the slip rate along the San Andreas fault.

Displacement of the strata close to the southern boundary points to the existence of additional subsidiary faults parallel to the main bounding fault, along which the basin subsided. The evidence for active tectonic activity along the southern fault is consistent with observations of high heat flow and volcanism along the southernmost Salton Sea[5,6]. Subsidiary north-northeast-trending faults lie under the water and were not previously known. They need to be considered in seismic hazard assessment as they are probably big enough to generate damaging earthquakes.

Based on their data, Brothers and colleagues suggest that extension accommodated by subsidence along northeast-trending faults was more important than block rotation. This is surprising because in other regions, rotating blocks are known to have accommodated a significant amount of lateral motion[7] as plates slide past each other. The region southwest of the Salton Sea is probably undergoing some block rotation, but its faults do not continue in a simple fashion into the Salton Sea. Thus, it would seem that there are two different styles of tectonic movements occurring in adjacent regions: rotation of fault-bounded blocks and vertical motion associated with extension and subsidence.

Several questions concerning the long-term activity of each of the various fault systems associated with the Salton Sea remain unanswered. For instance, it is not clear whether tectonic activity flips back and forth between the largely lateral motion associated with the rotating blocks and vertical motion associated with subsidence. We know that seismicity does not fully reveal the long-term three-dimensional fault pattern. For example, the southern San Andreas fault is now seismically quiet[8] even though it had a large earthquake three centuries ago[9].

The data presented by Brothers and colleagues[1] represent a significant step in understanding the formation and evolution of the Salton Sea and the tectonic context of the southern San Andreas fault. Only by analysing high-resolution data and observational constraints can we understand how oblique extension along important plate boundaries can lead to the formation of sedimentary basins. ❐

Joann M. Stock is at the Seismological Laboratory 252-21, California Institute of Technology, Pasadena, California 91125, USA.
e-mail: jstock@gps.caltech.edu

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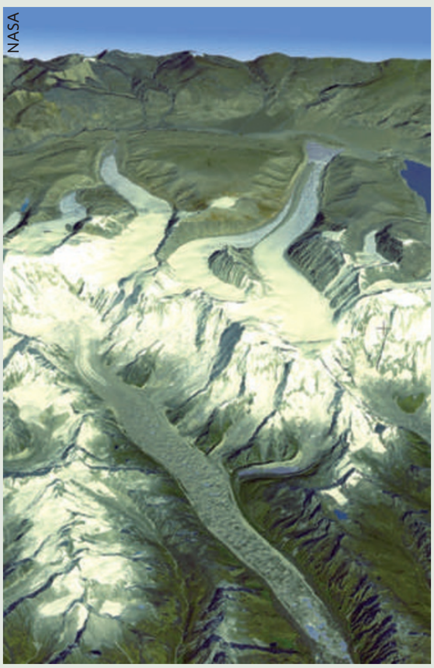
CARTOGRAPHY

Terra cognita


NASA

Humans have strived for a cartographic representation of their world for thousands of years. Mapping the Earth was one of the motivations of the early explorers, and armies of surveyors have worked towards an accurate description of the topography of the globe. With satellite data giving us an unprecedented overview of our planet, cartography has reached new heights. Now an accurate map of (almost) the whole Earth has become available.

Thanks to the efforts of the Japanese Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) and NASA's satellite Terra, 99% of the Earth's surface topography has been measured at a resolution of about 30 m. A digital elevation map covering the planet from Peary Land at the northernmost edge of Greenland right into the centre of Antarctica's Ross Ice Shelf — or from 83° N to 83° S — was released at the end of June.

The map is based on almost 1.3 million individual photographs taken in stereo pairs by the ASTER instrument — such as the one from the Bhutan Himalayas shown here with an image in natural colour obtained with the same instrument draped over it. The digital elevation model is freely available online (http://www.gdem.aster.ersdac.or.jp) — or will be, once the servers have caught up with the high demand. At the point of writing, potential users are warned that sessions may be disconnected before the download has started, because of excess traffic to the site.

ASTER's topographic data set substantially expands the coverage of the preceding data set, which included 80% of the Earth's surface, between the latitudes 60° N and 57° S. Now only the poles and their immediate surroundings remain to be charted.

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