Radar imaging of the lunar poles

Long-wavelength measurements reveal a paucity of ice in the Moon's polar craters.

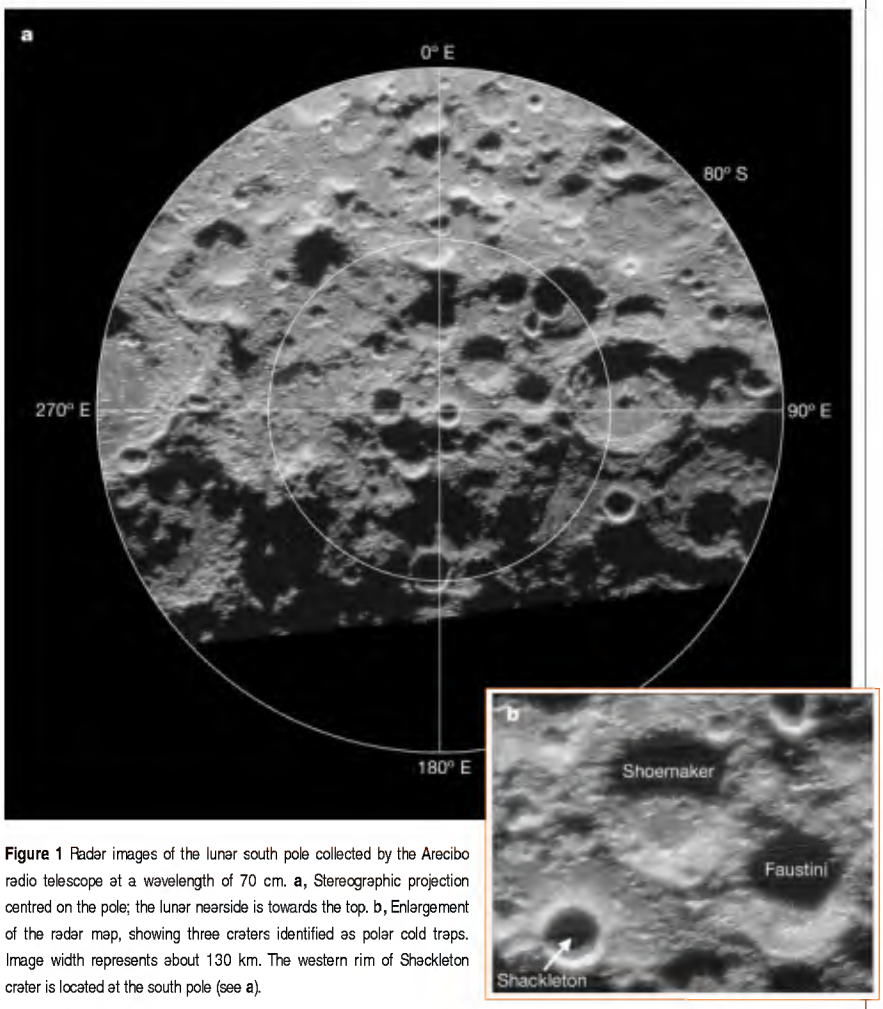

Figure 1 Radar images of the lunar south pole collected by the Arecibo radio telescope at a wavelength of 70 cm. **a**, Stereographic projection centred on the pole; the lunar nearside is towards the top. **b**, Enlargement of the radar map, showing three craters identified as polar cold traps. Image width represents about 130 km. The western rim of Shackleton crater is located at the south pole (see **a**).

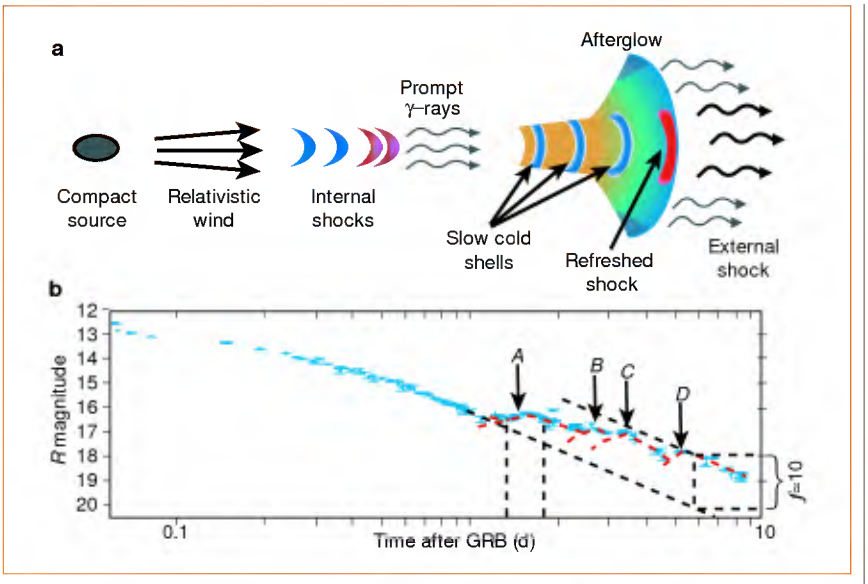

Figure 1 Refreshed shocks in γ-ray bursts. **a,** Illustration of a γ-ray burst: a compact source ejects a variable relativistic wind. Internal shocks within the outflow produce the γ-rays. At greater distances, the ejecta drives a strong shock into the surrounding medium, producing the afterglow. Slow shells ejected from the source catch up with the afterglow shock at late times, producing refreshed shocks; they thereby energize the afterglow and cause bumps in its light curve. **b,** Light curve of the GRB030329 burst (see http://lanl.arXiv.org/abs/astro-ph/0304563 for refs) shows a large bump (*A*, red line) at $t \approx 1.3$–1.7 d, followed by three less significant bumps (*B*–*D*, dashed red lines, at $t \approx 2.4$–2.8 d, $t \approx 3.1$–3.5 d and $t \approx 4.9$–5.7 d, respectively).

Astrophysics

Refreshed shocks from a γ-ray burst