



**SEX SUPPRESSED IN PLANTS**

Pollen and ova produced without meiosis.

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J. BURGESS/SPL

NASA

## TOP TARGETS

Although searching for polar ice is a top mission goal, Lunar Reconnaissance Orbiter scientists are also interested in other parts of the Moon. Here are 6 of 50 top-priority sites for the high-resolution camera.

**Ina 'D-caldera'** In 2006, scientists claimed that gases actively vent from this enigmatic site.

**Gruihuisen domes** Possible silica-rich volcanoes that resulted in domes, unlike the smooth, pool-like maria.

**Rimae Prinz** A possible hollow lava tube could offer radiation shielding for an outpost.

**Apollo 15 site** A chance to observe space weathering of astronaut tracks.

**Alphonsus crater** Deposits from a pyroclastic vent from a 'fire-fountain' volcano.

**Sulpicius Gallus** Strange, dark materials could provide a deep window into direct sampling of the Moon's mantle.

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really is focused on the water question," he says. That may reflect the fact that the \$500-million-plus LRO was paid for by the NASA division that advances human exploration, rather than its science division. Mark Robinson, principal investigator for the spacecraft's main camera, acknowledges that its suite of instruments would probably have been different had its mission arisen via the science directorate.

But Robinson, a geologist at Arizona State University in Tempe, says there will be plenty of data to satisfy scientists of any stripe. The high-resolution camera, working 50 kilometres above the Moon's airless surface, will have a resolution of 1 metre, finally giving scientists maps of the Moon as good as those available for Mars.

The camera will focus first on 50 sites determined by the exploration office (see 'Top targets'), but many of the sites have overlapping science questions. For instance, many of the Moon's maria — sea-like plains of basalt — are rich in titanium, which could be mined. But mapping the deposits could also help scientists understand mysteriously wide differences in titanium concentrations.

Just because NASA's astronaut office is interested in the LRO's data doesn't mean that scientists aren't, says Robinson. "You can't separate the two," he says. "Science enables exploration, exploration enables science."

Eric Hand

# Last weather ship faces closure

Leading climate scientists and oceanographers are urging the Norwegian government to revise or postpone the decommissioning of the world's last stationary weather ship.

Located at 66° N in the Norwegian Sea, some 450 kilometres off the coast, the M/V *Polarfront* maintains Station M (Mike), the last of what was a network of 13 weather stations in the North Atlantic. The International Civil Aviation Organization set them up in 1948 to support air traffic, but by 1974 only four were left, and the penultimate station closed in the 1990s.

Now, as satellites, buoys and reports from moving ships have eclipsed the stationary station for weather-forecasting purposes, the Norwegian government says it cannot justify the expense and intends to decommission the ship by 31 December. Annual operational costs are €2.5 million (US\$3.5 million), most of which is paid for by the Norwegian Meteorological Institute in Oslo. The station constitutes more than half of the institute's running expenses for all meteorological observations in the country, including weather radars.

Researchers protest that the shutdown will harm crucial observational programmes in the climate and ocean sciences. "It's a blow," says Ingunn Skjelvan, a chemical oceanographer at the Bjerknes Centre for Climate Research in Bergen, Norway.

"Equally reliable ocean time series are just not available from satellites, buoys or drifting vessels," says Margaret Yelland, a physical oceanographer at the National Oceanography Centre in Southampton, UK.

In more than 60 years of observations, Station Mike has collected measurements of temperature and salinity down to 2,500 metres five times a week — the

world's longest time series of its kind. Among other things, the station has provided key information on the long-term variability of the Nordic seas and on changes in Atlantic Ocean circulation. "These are not oceanographic curiosities," says Tom Rossby, an oceanographer at the University of Rhode Island in Narragansett. "They are of fundamental importance."

Shutting down the *Polarfront* "will have dramatic negative consequences for climate change research, as irreplaceable long-term measurements will come to an end", wrote Howard Cattle of the World Climate Research Program in a letter to Norwegian research authorities. "Other weather ships were withdrawn from service by the mid-1990s, before the importance of

such sustained observations for understanding climate was fully realized."

Deploying and calibrating hydrographic moorings to

replace the *Polarfront* for climate-quality measuring will require at least a couple of years, experts say.

Norway's research minister, Tora Aasland, has acknowledged the urgent need for new monitoring infrastructure. In a response last month to letters from worried scientists, she said that the Research Council of Norway is prepared to consider scientific proposals for work at Station Mike, and that a decision on funding those could be made this summer.

Even so, the days of the *Polarfront* seem to be numbered. "I have received an overwhelming number of statements stressing the importance of continuing the operation of the ship, but no further offers to share the expenses," says Anton Eliassen, director of the Norwegian Meteorological Institute.

Quirin Schiermeier

**"I have received no further offers to share the expenses."**



Without funding from elsewhere, the M/V *Polarfront* will be decommissioned.

M. YELLAND