**Geology of Ice Deposits at the Lunar Poles**

Remote sensing data have shown that there is considerable ice associated with permanently shadowed regions near the lunar poles. This has garnered considerable interest as a source of rocket propellant to fuel a robust human presence throughout the Solar System (see PSRD report: *Refueling Space Exploration*). In short, polar ice deposits are potentially of significant commercial value. However, evaluating potential ore deposits requires knowing a lot about the concentration and distribution (vertically and horizontally) of the potential resource (in this case H$_2$O ice) and its accessibility. Obtaining this geologic knowledge requires data, of course, but also an understanding of the geologic processes and geologic history of the region of interest.

Kevin Cannon and Dan Britt (University of Central Florida) have developed a geologic model of polar deposits, from the source of the H$_2$O, its deposition, and its retention in the frigid polar regolith. They found, for example, that places with high, mineable concentrations of ice are distributed randomly, in contrast to typical terrestrial ore deposits, which are sequestered into relatively small ore bodies.

Maps of the Ice Favorability Index (IFI) in the northern (left) and southern (right) polar regions of the Moon. The IFI is based on modeling a source term (where the H$_2$O comes from), a capture term (the nature of polar cold traps), and a retention term (how H$_2$O is preserved in polar regolith). The white squares on the south polar map indicate the locations of Cabeus crater (left) and Shackleton crater (lower right), which Cannon and Britt discuss in detail.

See Reference:
See also:


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