

**GLOBAL DISTRIBUTION OF NEUTRONS FROM MARS:
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Global distributions of thermal, epithermal, and fast neutron fluxes have been mapped using the Mars Odyssey Neutron Spectrometer during northern winter (centered on $L_s = 334.5^\circ$). These fluxes taken together are selectively sensitive to the spatial and stratigraphic distributions of H and CO_2 . Comparison of correlated variations of the three energy ranges of neutron flux over the planet reveals the following: 1) The entire domain south of -60° latitude is very rich in hydrogen. 2) This hydrogen rich layer is buried beneath a relatively hydrogen poor overburden. 3) The residual south polar cap is covered by a thick layer of CO_2 . 4) Extended portions of near-equatorial highlands terrain that are associated with lacustrine environments contain buried deposits of hydrogen-rich material. 5) The central portion of the north polar cap extending down to about $+60^\circ$ latitude is covered by a thick layer of CO_2 . and 6) The equatorward margins of the north polar cap extending at places down to about $+45^\circ$ latitude contain buried deposits of hydrogen-rich material.