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# Exploration of a Small Volatile-Rich World: New Light on Ceres

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In March 2015, Dawn arrived at Ceres after its 7.5-year journey. It had orbited and mapped Vesta before arriving at its final target, the largest body in the main asteroid belt. There it found a dark, dry, heavily cratered surface punctuated by small bright spots. Ceres encountered a similar cratering population to that encountered by Vesta and is just as cratered at smaller sizes, but Ceres is missing the largest expected craters and is gravitationally relaxed at lowest orders. Ceres' crust consists of a thin lag deposit containing ammoniated clay of probable endogenous origin, carbonates and dark material, and exhibits bright patches of possible salt concentrations. To be consistent with the crater distribution and the gravity data, there must exist beneath this crust a strong lithosphere of water-ice and rock, containing carbonates and salt. Under this 'upper mantle' must be a lower mantle, consisting of a warmer, weaker athenosphere of similar chemical composition. In the center lies a solid core. Flat crater floors, flows of material across the surface, isolated mountains at least one of which appears to be an ice volcano, all point to the importance of volatile-driven activity on Ceres that likely involves brine-driven cryovolcanism.