

Oceans In The Solar System

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Recent research has revealed evidence for oceans with a variety of settings and historical contexts on planetary bodies other than the Earth, and these results have provided new perspectives on possible environments for the formation and evolution of life. Mars Global Surveyor laser altimeter data have revealed evidence supporting the presence of large standing bodies of water at the scale of seas and oceans in the past history of Mars. The distinctive outflow channels empty into the northern lowlands and disappear abruptly at the position of a contact interpreted to be an ancient shoreline. This contact shows a reasonably close approximation to an equipotential surface and vertical variations along this contact occur in areas with post-contact-formation geological activity (*e.g.*, Tharsis). The surface is smoother below the contact at all scales as might be expected from underwater sedimentation, and the volume of the region below the contact is equivalent to a global layer 100 m thick. Geologic features suggest the presence of bodies of water and subsequent ground ice over extended periods. Galileo data support the probable presence of global oceans in the past history of Ganymede and presently on Europa. On Europa, the very young water ice surface shows evidence of recent disruption and modification, suggestive of an active region such as an ocean at very shallow depths. The global 100 km thick water layer is underlain by a silicate mantle and possible hydrothermal activity. These examples provide important perspectives on early Earth and Titan environments.