Titan is a unique moon in the solar system as it is the only one with a thick atmosphere, and surface lakes and seas. Observations made by the Cassini/Huygens probe showed the potential of a subsurface ocean hidden below the outer crust made of ice. This thesis analyzes the heat transfer through the crust of Titan to understand the long term evolution of the ocean. We developed a finite element model of the heat transfer through a thickening ice crust and investigated the effect of viscosity, internal heat flux, and ammonia concentration in the ocean. While other explanations cannot be ruled out, it was found high values of viscosity and possible ammonia presence could keep the ocean liquid for long periods.