Within the neighbourhood of onshore Adana and Mut basins at the north, Cyprus at the south and Missis High at the east, Miocene Mersin Basin, is one of the fronteer offshore basins where Turkish Petroleum Corp. has the exploration rights. In order to investigate the hydrocarbon potential of the Miocene Mersin Basin, a 3D basin model was prepared using 2 off-shore wells which are within the project area and outputs of the 2D seismic interpretations. Other then well data, the regional geology and stratigraphy were used to build the chronostratigraphy of the model which begins at 23.2Ma. Using the 12 horizons derived by the seismic interpretations, paleogeometries were established. Not only the isopach maps of formations but also onshore analogies were used to select the appropriate lithologic constituents of the facies. Since Miocene Mersin Basin is a fronteer basin, there are some uncertainties but keeping those in mind, the model shows enough maturity in certain depths for a possible source rock to generate and expel hydrocarbons. Outputs of the 3D basin model of the fronteer Miocene Mersin Basin shows that it has a potential for hydrocarbon exploration.