Identify the origin of petroleum in south Caspian basin by geochemical modeling method

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The Caspian Sea by 371.000 square kilometer is the largest enclosed sea in the world and it is independent of the eustatic level change. The shallow part of the basin is located in the north and the depth of basin increases to southwest up to 1250 meter. Sea level change is controlled by the Volga River's input which depends to atmospheric conditions. The Caspian Sea is rich in energy resources and our research is focused on south Caspian basin. The southern Caspian basin is considered as a back arc basin which was made in cretaceous and includes 28 km of sediment in the deepest part. Our study is focused on Cretaceous units up to upper Miocene. One of the aims, in this study was to predict the limit of thermal maturity in potential source rocks and also to create the geochemical model which includes how hydrocarbons are producing in source rock in the south Caspian basin. Onshore Field work data, offshore seismic profiles, gravity data, boreholes data and deep crustal structures are used in the model. For geological model, based on gravity and seismic data, the central part of basin has oceanic crust and it changes to continental crust in both sides. As a result the basal heat flow entering the modeled sections can be calibrated to present day bottom hole temperature data by using a constant basal heat flow over the bulk of the south Caspian basin. The center of the basin is thought to be cool due to the existence of oceanic crust, while the flanks have a higher heat flow through the sediment fill due to radiogenic input of heat from the continental crust. Late Cretaceous rifting is thought to have no impact on the main source rock in the region and maturation is believed to have occurred very recently, probably within the last 5my. In deep parts of the basin maturation can be early for the lower Maykop sequence. As a further assumption, Maykop unit was deposited 35 to 15my ago but it comes to be mature in the last 5 my. Based on our model, lower to middle Maykop units still remain as a main source candidate and maturity rate can reaches up to 70-80% TR. The next more important unit can be middle Maykop. Also, this model suggests that the deep Sefidrud basin should be generating high maturity gas as a anomaly but it has not any evident in the sea bed coring data.