The Isparta Angle (IA) is formed as a morphotectonic pattern and located in the north of the Antalya Gulf. It is a seismotectonically very active zone as in the Eastern Mediterranean Region. The shape of Isparta Angle is a wedge-like with flanks oriented NE–SW in the west and NW–SE in the east rather than compressional E–W-oriented structures preceding its present shape. It results from the clockwise and anti-clockwise rotation of the Anatolian Plate from the Early Paleocene to the Early Pliocene. In this study, we determined the neotectonic pattern of the IA by using arrival time data of P and S waves. We assessed the 3-D tomographic images from the data of local earthquakes. The tomographic results verified the major tectonic structures and discontinuities in the studied area. The results have revealed the young structural heterogeneities related to the seismotectonic zones. While the higher Vp and Vs distributions are determined in the shallow levels of the earth, low-velocity perturbations are extensively distributed at deeper levels of the crust. The seismotectonic activity, seen along heterogeneous zones, denotes the high-velocity perturbation and is related to the pre-existing faults. The results of checkerboard tests showed that the anomalies are reliable down to approximately 40 km depth. From the middle to the lower crust, the low-velocity zones are related to the geophysical and geological evidence in the Fethiye–Burdur Fault Zone (FBFZ) and the existence of mantle material is consistent with the partial melt in the upper mantle. Furthermore, the present study revealed the new active zones from 3-D tomographic results: the NW-trending Yalvaç, NE-trending Gelendost, and approximately N–S-trending Eğirdir–Kovada grabens existing in the northern core of IA.