The geometry of the triple junction between the Eurasia, Nubian and North-America plates in the vicinity of the Azores islands was the subject of several of interpretative models since the early works of Krause and Watkins (1970). In spite of the increasing amount of geophysical data acquired in the last decades, several questions remained unanswered: (1) In what location do the three plates meet if they do? (2) What are the tectonic effects of the northward triple point migration? (3) How did the Azores spreading axis configuration evolved with time?. We use a new 1' magnetic anomaly grid computed with the CM4 model for the North Atlantic (Luis and Miranda, 2008) and a new 250m spacing bathymetric grid for the Azores plateau, to show that the triple junction is materialized by a 70 x 60 km lithospheric block which is continuously sheared by the differential motion between the EU-NA and the NU-NA plate pairs and acts like a “triple junction finite area”; we show that this configuration is active since the chron c2a and we hypothesize its previous configurations, and we identify the corresponding tectonic signatures in the Azores plateau. This work is a MAREKH PTDC/MAR/108142/2008 contribution.