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Complexity measures and variability of the seismicity monitored within the Mexican flat slab before the main shock occurred on 19 September 2017

Alejandro Ramírez-Rojas¹ and Elsa Leticia Flores-Márquez²

¹Universidad Autónoma Metropolitana, Ciencias Básicas, México City, México (arr@correo.azc.uam.mx)

²Instituto de Geofísica, Universidad Nacional Autónoma de México, México City 04510, México

Several subduction zones exist in Earth, which have a more or less known dynamic, however each of them has its particularities, as in the case of the Mexican subduction zone, where the flat slab is of special interest. The present flat-slab area is located along the central part of the Cocos-North America plate boundary that the convergence rate between Cocos and North America. The Cocos plate is a remnant of the large Farallon plate, which began to split into smaller plates since 28 Myr ago approximately, when the East Pacific Rise began to interact with the North American Plate. Within such flat slab could be triggered large and destructive earthquakes like the main shock occurred close to Mexico City on September 19, 2017. In this work, we analyze, under the natural time domain, the seismicity registered within the Mexican flat slab since 1995 until the main shock occurred on September 19, 2017. We analyzed the fluctuations of order parameter for seismicity in order to provide some complex measures defined on natural time. Our analysis reveals a possible precursor measure switching on a few weeks before the main shock. Also we have observed that in the flat slab region the number of earthquakes recorded is lesser than those observed along the total south Pacific Mexican coast.