

# Japan Geoscience Union Meeting 2011

(May 22-27 2011 at Makuhari, Chiba, Japan)

©2011. Japan Geoscience Union. All Rights Reserved.



MIS036-P03

Room:Convention Hall

Time:May 26 14:15-16:15

## The Relative Quiescence and its Recovery of Seismicity Preceding 2011 M9.0 Earthquake in the east off Tohoku District

Ritsuko S. Matsu'ura<sup>1\*</sup>, Koji Iwasa<sup>1</sup>

<sup>1</sup>Earthquake Research Center, ADEP

The devastating M9.0 earthquake occurred on 11 March 2011 in the east off Tohoku district. Its hypocenter was located where M8-size earthquakes occurred in 1793 and 1897, which were destructive to the southern part of Tohoku district. In order to reveal the preparation process of a huge earthquake, we examined 126 years seismicity quantitatively with data of M6.0 and larger earthquakes in the area of east-off Tohoku district, Japan, by the point-process analysis. The area was chosen by the geological information to avoid some intentional or subjective selection of the examined area. The residuals from the ETAS model show the most significant decrease of the activity in the area from 1998 to 2002. The significant increase of the activity is only seen in 1938-1939 during 126 years, when the extraordinary swarm of six  $M \geq 6.9$  earthquakes occurred off Shioyazaki promontory, Fukushima prefecture. These two significant activity changes are robust to selections of the term length of data to be used, and the window width for counting the residuals. The activity was restored to the normal level gradually until 2008. In order to explain the decrease then recovery of seismicity before a large earthquake, there should be some preparation process such as absorbing pore fluid in surrounding area should be antecedent to the pre-slip before a large main shock. Since the beginning and ending of this large relative quiescence could be detected a few years in advance, it can be utilized as one component for the long-term forecast.

Keywords: 2011 M9.0 East off Tohoku Earthquake, point process, residual analysis, precursor in seismicity before pre-slip, quiescence and its recovery