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Assessment of Community Internet Intensity (CII) in Sakhalin Island

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Sakhalin Island is a region with high rate of seismic activity. Tens of felt earthquakes occur within the studied area every year. Rapid macroseismic observation through the web questionnaires, social networks etc. gives reliable information about ground shaking intensities and today is processed by major seismological agencies (Bossu et al., 2018; Quitariano and Wald, 2020).

The recent development of the methodology began with the web-based macroseismic observations following Dengler and Deweey (1998) and Wald et al. (1999). Widespread global use of Community Internet Intensity (CII) was routinely applied by the U.S. Geological Survey (USGS) through the USGS DYFI questionnaires. Over 5 millions felt reports were collected during last 15 years (Quitoriano and Wald, 2020).

During last 5 years the methodology was tested in Sakhalin Island (Konovalov et al., 2018). For the collection of felt reports we used regional internet resource (<https://eqalert.ru/#/>). The DYFI USGS questionnaires translated into Russian were used for processing the macroseismic information. The felt reports of the respondents from each settlement were transformed to the Community Weighted Sum (CWS) which takes into account various indicators of ground shaking: human sensations, position of objects, visible damages of the building. The CII was calculated using the equation (Wald et al., 1999):

$$\text{CII} = 3.4 \ln (\text{CWS}) - 4.38.$$

The obtained values were rounded to the first number after the comma. In general CII should be similar to the MM intensity.

During the period from 2016 to 2020 we have got about 400 felt reports. Most of the responses came in the first minutes after the origin time of seismic event. Data with only one report or incorrectly submitted questionnaires were excluded in further calculations. The small number of the felt reports may be explained by low population density of the central and northern districts of Sakhalin Island. Finally we have found correlation between the CII and PGA (cm/s/s) which is given by the equation:

$$\text{CII} = 2.5 \log (\text{PGA}) + 2.32.$$

It is suggested that given approach can be used as a robust tool for express analysis of ground shaking. It is also a good way to involve the population and bring them closer to understanding the

scientific process in the era of the growth of computer technology and social networks.