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M5 Earthquake of 29.03.2016 in Storefjorden strait, Svalbard

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On 29 March 2016 at 10:32:08 UTC an earthquake with the magnitude of ML=5.0 occurred in Storefjorden strait, Svalbard at the point of 77.78N and 20.98E. The earthquake was followed by a strong aftershock with ML 4.8 occurred in 30 seconds after the mainshock at about the same place. The time delays between the signals produced by these two earthquakes are the same in different seismic stations. This proofs that the second signal was not produced by the first event due to reflecting its seismic waves from any inhomogeneity within the Earth. Neither regional nor global earthquake catalog excepting one made by Kola Branch of Geophysical Survey of Russian Academy of Sciences includes the second earthquake (strong aftershock). The reason is that the records of P waves of the aftershock are hidden by the mainshock coda. Filtering the waveform in the band of 6-12 Hz allows picking onsets of the P and S waves and locating the second event. Unfortunately, it is impossible to measure onsets signs in different stations for estimating the focal mechanism. We checked more than 240 aftershock sequences chosen by Reasenberg and Molchan-Dmitrivea declustering algorithms using the data from ANSS catalog for 1975-2015 covering the whole Earth and found the only earthquake of 1985.03.03, 22:47:07 UTC, M8 near the coast of Chile that followed by M7.5 aftershock occurred in 20 seconds after the mainshock. So, earthquake of 29.03.2016 in Storefjorden is the only one in intraplate condition that has an aftershock occurred just after the mainshock and comparable to its magnitude. Thus, this earthquake and its aftershocks are unique events not only for Svalbard region but also for global seismicity. Here we also present location of the earthquake of 29.03.2016 and its aftershocks using data of 4 closest seismic station and fault plane solution of the first event calculated by regional and teleseismic data using onset signs, an appropriate nodal plane (strike 44, dip 82, rake 172) was chosen by orientation of the aftershocks epicenters.