

## The February 14, 2013 Ilin-Tas (Abyi) earthquake (Mw=6.7), Northeast Yakutia

© 2020 S.V. Shibaev<sup>1</sup>, B.M. Kozmin<sup>1,2</sup>, V.S. Imaev<sup>3</sup>, L.P. Imaeva<sup>3</sup>,  
A.F. Petrov<sup>1</sup>, N.N. Starkova<sup>1</sup>

<sup>1</sup>YB GS RAS, Yakutsk, Russia; <sup>2</sup>DPMGI SB RAS, Yakutsk, Russia; <sup>3</sup>IEC SB RAS, Irkutsk, Russia

**Abstract** Information on the strong Ilin-Tas (Abyi) earthquake recorded on February 14, 2013 in Northeastern Yakutia with Mw=6.7 is provided. It arose to the Chersky seismotectonic zone (SZCH), which is part of the Arctic-Asian seismic belt that separates the Eurasian and North American lithospheric plates in Northeast Asia. The intensity of the shock at the epicenter corresponded to 9. The instrumental and macroseismic data, the focal mechanism, and the seismotectonic situation in the epicenter region are analyzed. The interconnections of the earthquake with the large regional Ilin-Tas fault are established. It is concluded that the occurrence of the Ilin-Tas (Abyi) earthquake occurred as a result of thrust displacements along the mentioned fault during the collision of the Eurasian and North American plates under compression conditions.

**Keywords** seismicity, focal mechanism, Ilin-Tas fault, isoseisms, Eurasian and North American plates.

**For citation** Shibaev, S.V., Kozmin, B.M., Imaev, V.S., Imaeva, L.P., Petrov, A.F., & Starkova, N.N. (2020). [The February 14, 2013 Ilin-Tas (Abyi) earthquake (Mw=6.7), Northeast Yakutia]. *Rossiiskii seismologicheskii zhurnal* [Russian Journal of Seismology], 2(1), 92-102. (In Russ.). DOI: <https://doi.org/10.35540/2686-7907.2020.1.09>

### References

- Apel, E., Burgmann, R., Steblov, G., Vasilenko, N., King, R., & Pritkov, A. (2006). Independent active microplate tectonics of northeast Asia from GPS velocities and block modeling. *Geophysical Research Letters*, 33(L11303). doi: 10.1029/2006.GL026077.
- Gajduk, V.V., & Prokop'ev, A.V. (1999). *Metody izucheniia skladchato-nadvigovykh poiasov* [Methods for studying fold-thrust belts]. Novosibirsk, Russia: Nauka Publ., 160 p. (In Russ.).
- GS RAS. (2019). Bulletin of Teleseismic Stations. Retrieved from [ftp://ftp.gsras.ru/pub/Teleseismic\\_bulletin/2013/](ftp://ftp.gsras.ru/pub/Teleseismic_bulletin/2013/)
- Gusev, G.S. (1979). *Skladchatye struktury i razlomy Verkhoyano-Kolymskoi sistemy mezozoid* [Folded structures and faults of the Verkhoyansk-Kolyma system of the Mesozoid]. Moscow, Russia: Nauka Publ., 207 p. (In Russ.).
- Gusev, G.S., Veklich, V.S., & Tret'jakov, F.F. (1976). [Morphokinematic characteristic of faults in the Verkhoyansk-Chukotka folded region]. In *Razlomnaia tektonika territorii Yakutskoi ASSR* [Fault tectonics of the territory of the Yakut ASSR] (pp. 150-159). Yakutsk, Russia: YB SB AS USSR Publ. (In Russ.).
- Imaev, V.S., Imaeva, L.P., & Koz'min, B.M. (1990). *Aktivnye razlomy i seismotektonika Severo-Vostochnoi Yakutii* [Active faults and seismotectonics of North-East Yakutia]. Yakutsk, Russia: JINR SB RAS Publ., 140 p. (In Russ.).
- Imaev, V.S., Imaeva, L.P., & Koz'min, B.M. (2000). *Seismotektonika Yakutii* [Seismotectonics of Yakutia]. Moscow, Russia: GEOS Publ., 227 p. (In Russ.).
- Imaeva, L.P., Imaev, V.S., Koz'min, B.M., & Mackey, K.G. (2015). Structural dynamic analysis of the epicentral zone of the Ilin-Tas earthquake (Feb14, 2013, MS=6.9). *Journal of Seismology*, 19(2), 341-353.
- International Seismological Centre. (2015). On-line Bulletin, Internatl. Seis. Cent., Thatcham, United Kingdom, 2015. Retrieved from <http://www.isc.ac.uk/iscbulletin/search/bulletin/>
- Koz'min, B.M. (2005). [Yakutia]. In *Zemletriaseniia Severnoi Evrazii v 1999 godu* [Earthquakes of Northern Eurasia, 1999] (pp. 181-189). Obninsk, Russia: GS RAS Publ. (In Russ.).
- Koz'min, B.M. (1984). *Seismicheskie poiasa Yakutii i mekhanizmy ochagov ikh zemletriasenii* [Seismic belts of Yakutia and the focal mechanisms of their earthquakes]. Moscow, Russia: Nauka Publ., 127 p. (In Russ.).
- Koz'min, B.M. (1987). [Earthquakes of Yakutia]. In *Zemletriaseniia v SSSR v 1984 godu* [Earthquakes in the USSR in 1984] (pp. 146-150). Moscow, Russia: Nauka Publ. (In Russ.).
- Koz'min, B.M., Shibaev, S.V., Imaeva, L.P., Imaev, V.S., & Petrov, A.F. (2019). [The January 20, 2013 Ulakhan-Chistai earthquake of  $K_R=14.4$ ,  $M_w=5.6$ ,  $I_0=8$  (Northeast Yakutia)]. In *Zemletriaseniia Severnoi Evrazii* [Earthquakes in Northern Eurasia], 22(2013), 320-328. (In Russ.).

- Koz'min, B.M., & Shibaev, S.V. (2019). [Yakutia]. In *Zemletriaseniia Severnoi Evrazii* [Earthquakes in Northern Eurasia], 22(2013), 224-231. (In Russ.).
- Krasilov, S.A., Kolomiyets, M.V., & Akimov, A.P. (2006). [Organization of processing of digital seismological data using the WSG software package]. In *Materialy Mezhdunarodnoi seismologicheskoi shkoly "Sovremennyye metody obrabotki i interpretatsii seismologicheskikh dannykh"*. [Proceedings of the International Seismological Workshop "Modern Methods of Processing and Interpretation of Seismological Data"] (pp. 77-83). Obninsk, Russia: GS RAS Publ. (In Russ.).
- Mackey, K.G., Fujita, K., & Ruff, L.J. (1998). Crustal thickness of Northeast Russia. *Tectonophysics*, 284, 283-297.
- Medvedev, S.V., Shponhoyer, V., & Karnik, V. (1965). *Shkala seysmicheskoy intensivnosti MSK-64* [MSK-64 seismic intensity scale]. Moscow, Russia: MGK Academy of Sciences USSR Publ., 11 p. (In Russ.).
- Shibaev, S.V., Koz'min, B.M., Starkova, N.N., Karataeva, A.S., Hastaeva, E.V., & Moskalenko, T.P. (2019). [Catalog of earthquakes and explosions of Yakutia with  $K_R \geq 7.6$  for 2013]. In *Zemletriaseniia Severnoi Evrazii* [Earthquakes in Northern Eurasia], 22(2013). Appendix on CD-ROM. (In Russ.).
- Shibaev, S.V., Koz'min, B.M., Petrov, A.F., Имаева, Л.П., & Timirshin, K.V. (2014). [Andrey-Tassk earthquake 22.06.2008]. In *Zemletriaseniia Severnoi Evrazii, 2008 god* [Earthquakes in Northern Eurasia, 2008] (pp. 352-358). Obninsk, Russia: GS RAS Publ. (In Russ.).
- Steblov, G.M. (2004). [Interaction of Tectonic Plates in Northeast Asia]. *Doklady Akademii nauk* [Doklady Earth Sciences], 394(5), 689-692. (In Russ.).

### Information about authors

**Shibaev Sergey Valentinovich**, Director of the Yakutian Branch of Geophysical Survey of Russian Academy of Sciences (YB GS RAS), Yakutsk, Russia. E-mail: shibaev@emsd.ysn.ru

**Kozmin Boris Mikhailovich**, PhD, Leading Researcher of the Diamond and Precious Metal Geology Institute of Siberian Branch of Russian Academy of Science (DPMGI SB RAS); YB GS RAS, Yakutsk, Russia. E-mail: b.m.kozmin@diamond.ysn.ru

**Имаев Valeriy Suleimanovich**, Dr., Principal Researcher of the Institute of Earth's Crust of the Siberian Branch of the Russian Academy of Science (IEC SB RAS), Irkutsk, Russia. E-mail: imaev@crust.irk.ru

**Имаева Lyudmila Petrovna**, PhD, Senior Researcher of the IEC SB RAS, Irkutsk, Russia. E-mail: imaeva@crust.irk.ru

**Petrov Anatoliy Firsovich**, PhD, Chief Specialist of the YB GS RAS, Yakutsk, Russia. E-mail: petrov@emsd.ysn.ru

**Starkova Nyurgustana Nikolaevna**, Sector Manager of the YB GS RAS, Yakutsk, Russia. E-mail: stark\_nn@mail.ru