# Most important results of the scientific activity of the Seismological Division GS RAS in 2016–2020 (seismic research)

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**Abstract** The article presents the most important results of seismic studies carried out in 2016-2020 at the Seismological Division GS RAS. Work at the Chirkey's HPP, where natural oscillations of the dam and their seasonal changes were studied in detail and a method for monitoring the natural frequencies of the structure was developed. Research at the Sayano-Shushenskaya HPP, where the processes of interaction of operating hydroelectric units with surrounding structures were studied and it was found that under certain operating conditions of the equipment, there is a 10-20-fold increase in the natural oscillations of the dam, the source of which is natural oscillations (organ vibrations) in the penstocks. A method has been developed for assessing the response of structures to seismic impacts, based on the method of coherent reconstruction of standing wave fields and allowing to calculate the vibrations of an object arising from seismic impacts at its base. The possibilities of determining the natural vibrations of large objects based on low-frequency seismological records and their monitoring are demonstrated on the example of the results of the analysis of satellite images and seismological materials when determining the causes of the landslide on the Elbashinsky dump of the Kolyvan anthracite deposit in the Novosibirsk region. The possibility of using river seismic data to study the structure of the earth's crust at all depth, including the Moho boundary, has been substantiated using the example of data obtained during the development of the CDP-2D profile in the lower reaches of the river Lena.

**Keywords** Chirkey's and Sayano-Shushensk HPPs, natural oscillations of dams, monitoring of natural frequencies, seismic impacts on structures, river seismic exploration.

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