determine and describe borders, to develop conditions of protection in 2015 an integrated ecological survey will be performed, the project of decision for establishing specially protected natural sites is prepared. In 2016 investments in state ecological survey are planned. In case of positive decision of state survey, agreement of establishing specially protected sites by the body of Federal Agency for Subsurface Use, executive body in the sphere of forestry regulations, Ministry of Natural Resources and Ecology of the Russian Federation, Administration of Tomsk Oblast the key ornithological site of Tomsk Oblast will acquire the legal status.

Thus, in the nearest future, in the network of specially protected natural sites of Tomsk Oblast the following changes will take place: the reservation «Vasyugan» as well as three more new natural monuments will appear on the map, new reservations of regional significance. It will permit protection of unique landscapes of Tomsk Oblast and enable to preserve the biodiversity of the region and international community in general.

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ESTIMATION OF RELATIVE SPECTRAL CORRECTIONS IN REGIONAL SEISMIC STATION NETWORK (KAMCHATKA)

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Kamchatka Krai is located in the far north-east of Russia and covers an area of 472.3 km^2. The southernmost point is Cape Lopatka (50,57 ° N), the northern one is situated near the Arctic Circle (65 ° N). Kamchatka borders on the Kurils in the south and the Chukotka Autonomous Okrug and the Magadan oblast in the north and north-west. It is washed by the Pacific Ocean in the east, the Bering Sea in the northeast, and the Sea of Okhotsk in the west [1].

Kamchatka is the only region of active volcanism within Russian. Over the 70% of the territory is covered by mountains. On the peninsula there are more than 1,000 volcanoes, including 28 active ones. Moreover, Kamchatka ranks the most seismically active region in Russia.

Researches of spectrographic corrections have been performed since 50s of the 20th century. It was found out that surface geology has an effect on conditions of seismic wave propagation, and this is the main factor, which determines seismic station corrections value. Station corrections are required for accurate determination of earthquake energy grade. In Kamchatka environments station corrections can characterize peculiarities of attenuation and propagation of seismic waves in volcanic media of active volcanoes [2].

The main purpose of the present research is to enhance reliability of Far-East earthquakes energy grade estimation.

Objectives are to sort out relevant seismic datasets from collection of Kamchatka regional seismic network data and to check the quality of this data and calculate spectral corrections.

Spectral characteristics are used for surface-consistent amplitude correction determination, microseismic zoning, etc. Under reference conditions determination of spectral characteristics (transfer functions) should be carried out relative to mantle (absolute values). However, in practice relative characteristics are employed. It means that base spectrum is recorded on base seismic station. Permanent registration points, for example, GS RAS base seismic stations are commonly used in this case. Among stations located within the surroundings of Petropavlovsk-Kamchatsky the station “Petropavlovsk” (PET) is referred to as a base station.

Spectral corrections determination of Kamchatka regional network stations was performed using MATLAB package. The procedure involved four stages.

The first stage was focused on acquisition of S-wave and seismic noise records from DIMAS-files (DIMAS – base operating program in tsunami watch). The second stage included mathematical processing of information, which involved smoothed Fourier spectrum selection. After that S-wave and noise spectra were superimposed and the obtained pattern distinguished “effective” sections, where value of S-wave spectrum is 5-10 times greater than value of noise spectrum. Spectral corrections were calculated as a ratio of “effective” sections of the station under the study to PET “effective” sections.

Data-processing operations were carried out using 20 records from Petropavlovsk area stations (Table).

Table

List of digital network stations (Petropavlovsk base station) for which preliminary spectral corrections were calculated

№	Station name	Code	Device type	Coordinates φ, N, λ, E
1	Administratsiya	ADM	Digital GSR-24+CMG-5T	53.023 158.650
2	Dalny	DAL	Digital GSR-24+CMG-5T	53.031 158.753
3	Dachnaya Ulitsa	DCH	Digital GSR-24+CMG-5T	53.057 158.639
4	Institute of Volcanology	IVS	Digital GSR-24+CMG-5T	53.066 158.608
5	Karymshino	KRM	Digital GSR-24+CMG-5T	52.828 158.131
6	Petropavlovsk Majak	MPPA	Digital GSR-24+CMG-5T	52.887 158.704
7	Mishenskaya Sopka	MSN	Digital GSR-24+CMG-5T	53.044 158.639
8	Nikolaevka	NIC	Digital GSR-24+CMG-5T	53.045 158.341
9	NIIGTC	NII	Digital GSR-24+CMG-5T	53.080 158.641
10	s/st Petropalovsk	PET	Digital GSR-24+CMG-5T	53.024 158.653
11	s/st Petropalovsk	PKC	Digital GSR-24+131 A	53.024 158.653
12	Rybachiy	RIB	Digital GSR-24+CMG-5T	52.917 158.533
13	Russkiy	RUS	Digital GSR-24+CMG-5T	52.432 158.513
14	Shkola	SCH	Digital GSR-24+CMG-5T	52.958 158.674
15	Shipunsky Cape	SPN	Digital GSR-24+CMG-5T	53.106 160.011
16	Sport camp “Zvezdniy”	SPZ	Digital GSR-24+CMG-5T	53.056 158.666
17	Viluchinsk	VIL	Digital GSR-24+CMG-5T	52.931 158.404

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SON DOONG - THE WORLD'S LARGEST CAVE IN VIETNAM

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More than 25 percent of the world's population either lives on or obtains its water from karst aquifers. Karst topography is a landscape formed from the dissolution of soluble rocks such as limestone, dolomite, and gypsum. It is characterized by underground drainage systems with sinkholes, dolines, and caves. It has also been documented for weathering-resistant rocks, such as quartzite, given the right conditions. Subterranean drainage may limit surface water with few to no rivers or lakes. However, in regions where the dissolved bedrock is covered (perhaps by debris) or confined by one or more superimposed non-soluble rock strata, distinctive karst surface developments might be totally missing. Karst regions contain aquifers that are capable of providing large supplies of water. Limestone cave system in Vietnam mainly located in the northern of the country by the focusing more limestone mountains. Currently the total cave in Vietnam was discovered nearly 1000 cave. Besides the natural beauty by nature creates, the caves also contain archaeological and historic ruins.

Son Doong Cave was recognized as a UNESCO World Heritage site in 2003. As of 2009 it is the biggest known cave in the world, Son Doong Cave is located in Phong Nha-Ke Bang National Park, Bo Trach District, Quảng Bình Province, Vietnam, near the Laos–Vietnam border.

Son Doong was created 2-5 million years ago by river water eroding away the limestone underneath the mountain, where the limestone was weak, the ceiling collapsed creating huge skylights. Inside is a large, fast-flowing underground river. It is formed in Carboniferous / Permian limestone. According to the Limberts, the cave is five times larger than the Phong Nha Cave, previously considered the biggest cave in Vietnam. The biggest chamber of Son Doong is more than five kilometres long, 200 metres high and 150 metres wide. With these dimensions, Son Doong overtakes Deer Cave in Malaysia to take the title of the world's largest cave. The cave contains some of the tallest known stalagmites in the world, which are up to 70 m tall. Behind the Great Wall of Vietnam were found cave pearls the size of baseballs, an abnormally large size. It is very difficult to travel. During the first expedition, the team explored two and a half miles of Son Doong cave before a 200-foot wall of muddy calcite stopped them. They named it the Great Wall of Vietnam. Above it they could make out an open space and traces of light, but they had no idea what lay on the other side. A year later, they have returned - seven hard-core British cavers, a few scientists, and a crew of porters - to climb the wall, if they can, measure the passage, and push on, if possible, all the way to the end of the cave [3][4].

Sơn Đoòng Cave is not just gigantic in size. It houses a vast collection of unique features and rich biodiversity (as I will explain later). Special features like the two collapsed dolines provide natural openings where sunlight filters down to the bottom. Vegetation and tropical jungles grow inside the cave, unlike those seen anywhere else in the world. Initial research had shown that there were more than 200 species of vegetation identical to those living on the mouth of