

Volcanoes of Kurile-Kamchatka Islands Arc Information System for Integration Heterogeneous Volcanological Data

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Kamchatka is home to about 7100 volcanic edifices of various types, sizes, ages, and conditions, which appeared over the period of last 2-2.5 million of years; the Kuriles hosts more than 800 of them (Melekestsev, 2006). Active volcanoes pose a real threat to the local population and economics. These are multi-acting volcanoes, which has produced at least one, clearly identified and dated eruption over the period of the last 3500 years. The Kurile-Kamchatka region has 70 such volcanoes, which is about 15 percent of the total number of active volcanoes within the Pacific Ring of Fire.

Volcanoes of the Kurile-Kamchatka Island Arc (VOKKIA) web-based information system (geoportal.kscnet.ru/volcanoes/) as a part of the geoportal of the Institute of Volcanology and Seismology (IVS) FEB RAS integrate available volcanological data (geological, geophysical, petrological, geochemical, etc.), relating to the volcanoes of Kamchatka, Kurile Islands and adjacent water areas (Romanova et al., 2012). The main sources of information for VOKKIA are the data from scientific publications. In addition, we use an information web and local IVS FEB RAS resources about volcanoes: catalogs, databases, geographic information systems, different archives and collections volcanological data in various digital formats. The system has scalable module structure, it includes the sections: Volcanoes, Eruptions, Monitoring, Rocks, Images, References and Geoservices. VOKKIA provides a single interface to all components of its information blocks and an easy access to heterogeneous attributive data and associated interactive map services.

Volcanoes section of the system provides key data on volcanoes, i.e. names, synonyms, the IAVCEI number, geographic region, volcanic area, geographic coordinates of a summit, edifice height, volcano status, activity interval, type of edifice, rock composition, brief description, references etc. (Fig.). The system contains descriptions of 170 terrestrial and 113 submarine volcanoes at now. Detailed information is given for active volcanoes. Eruptions section is dedicated to classification of data on historical and recent volcanic eruptions. First, VOKKIA is completing of information about the historical eruptions from scientific publications and operative information about current eruptions from KVERT (Gordeev, Girina, 2014). Each eruption has brief description including dates when it started and ceased,

precursors, rock composition, volume of erupted products, energy, VEI, references etc. Monitoring section is a database, which consists of information releases from KVERT about volcanic activity in Kamchatka and the Northern Kuriles (http://www.kscnet.ru/ivs/kvert/index_eng.php). It includes Volcano Observatory Notice for Aviation (VONA) Information Releases, Weekly and Daily Releases, Operative Reports about eruptions etc. This section allows on-line monitoring via web cameras of the Kamchatka and Kuriles most active volcanoes. Rocks section contained data about chemical compositions and magnetic features of rocks for submarine volcanoes at now. Images section includes volcano and eruption photos, as well as images, maps, diagrams, graphs, satellite images and aerophotographs, and various forms of videos. References section is based on the IVS FEB RAS Repository (<http://repo.kscnet.ru>), which is a digital open archive of scientific papers of scientists from IVS and other authors (Romanova, 2013). Geoservices section includes OGC Web Mapping Services (WMS) and Google Earth based services of spatial data visualization. VOKKIA System design and data entry are in progress.

Fig. The example of volcano description (for Klyuchevskoy Volcano) in VOKKIA

References

Gordeev E.I., Girina O.A. Volcanoes and their hazard to aviation // Herald of the Russian Academy of Sciences. 2014. Vol. 84. No. 2. P. 134-142. doi: 10.1134/S1019331614010079.

Melekestsev I.V. Active and potentially active volcanoes of the Kamchatka-Kurile Island Arc in the beginning of XXI century: stages of study, definition of a term «active volcano», the impending eruptions and volcanic hazard // Bulletin of Kamchatka Regional Association «Educational-Scientific Center». Earth sciences. 2006. Vol. 7. No. 1. P. 15-35 (in Russian). http://www.kscnet.ru/kraesc/2012/2012_19/art9.pdf.

Romanova I.M. Open access Repository of the Institute of Volcanology and Seismology FEB RAS: principles of creation and implementation experience // Bulletin of Kamchatka Regional Association «Educational-Scientific Center». Earth sciences. 2013. Vol. 22. No. 2. P. 78-90 (in Russian). http://www.kscnet.ru/kraesc/2013/2013_22/art8.pdf.

Romanova I.M., Girina O.A., Maksimov A.P., Melekestsev I.V. Creation of complex information web system «Volcanoes of the Kurile-Kamchatka Island Arc» (VOKKIA) // Information and control system. 2012. Vol. 33. No. 3. P. 179-187 (in Russian). http://ics.khstu.ru/media/2012/N33_19.pdf.