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Quaternary arc magmatism at the Northern part of Sredinny Range on Kamchatka: preliminary report

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Kamchatka is a volcanic arc composed of three volcanic belts corresponding to the subduction of the northern part of the Pacific Plate. One of the volcanic belts, the Sredinny Ridge (SR) in the back arc region, extends north into the aseismic zone. We explored the northern part of SR (N-SR) (fig. 1), and found several Middle-Upper Pleistocene volcanic edifices. In order to understand the geodynamic and magmatic features, we carried out petrological and geochemical studies of the collected lava samples. All basalts and andesites have typical arc signatures such as positive Pb peaks, indicating subduction is involved. Most rocks are medium-K basaltic andesites, although the lavas of the Cone X located 10 km SSE from the Tobel'tsen cone are high-K andesites and dacites. Based on geophysical data and tectonic models, we assume that the relatively young volcanism that we discovered in the N-SR reflects the sequential attenuation of the movement of chips/microplates located between a series of transform zones Aleutian – Bering – Alpha – Beta – Gamma. These results are in good agreement with the geodynamic reconstruction of Seliverstov for time interval 1.8–0.05 Ma.

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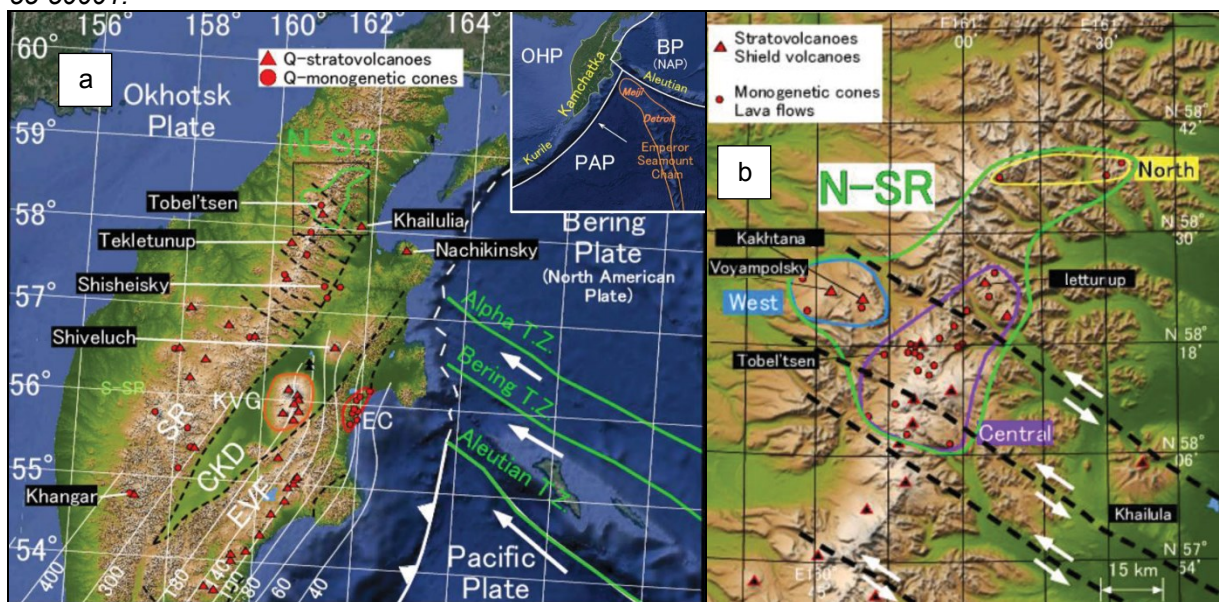


Fig. 1. Plate tectonic, geological structures and detailed map of the studied area. (a) The inset shows the plate tectonic setting. Green lines represent the transform zones. Red triangles and circles represent the Quaternary stratovolcanoes and monogenetic cones respectively on the three volcanic belts; the Eastern Volcanic Front (EVF), the Central Kamchatka Depression (CKD), and the Sredinny Range (SR). KVG – Klyuchevskaya Volcanic Group; EC – monogenetic volcanism at eastern cost of Kamchatka. White thin lines show depths to the subducting PAP slab. Black dashed lines represent faults. The area surrounded by green line is the N-SR. (b) Enlarged map of N-SR, which is subdivided into three areas; North (yellow), Central (purple), and West (blue). Red filled symbols are the sampling places.