Structural position of the eastern Kamchatka and central Italy geothermal systems: comparison

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We have analyzed structural position of the Eastern Kamchatka and Central Italy geothermal systems (Fig. 1). There are many similar features:
1 - volcanic belts where located the geothermal systems are oriented oblique to the tectonic structures of the basement;
2 - volcanic edifices of the volcanic belts are belonging to the volcanic centers (50-60 km in diameter): Vulsini, Vico, Sabatini, Albani - in Italy; Nalachevski, Karymski, Uzonski - in Eastern Kamchatka;
3 - volcanic centers constitute the chains alignment along the basement faults;
4 - the chains of volcanic centers located echelon-like with respect to each other along the volcanic belts;
5 - geothermal systems are located in the 'volcanic centers, the basement faults are define the position of it;
6 - there are tendency in the growth of the heat discharge of the geothermal systems along the chains of volcanic centers (in north-east direction on Kamchatka and in north-west direction in Italy).
Structural conditions of location Kamchatka's high-temperature hydrothermal systems are analyzed recently (Leonov, 2000). It is shown that the last ones are located within the boundary of Pliocene-Quaternary volcanic belts and confined to areas where these belts are superimposed on deep troughs of the basement. The main structural elements determining the position of high-temperature hydrothermal systems are faults, which bounds such troughs. These faults are rarely bared on the surface, they are usually overlapped with a powerful sedimentary -volcanogene cover, but systems of recent (mainly late Pleistocene-Holocene) fractures stretching along abyssal boundary are formed above them in this cover. Hydrothermal systems are located in such places where faults bounding troughs of the basement intersect complicating faults having transversal or intersecting position. Usually in such sites stable and long-existing zones of earth's crust penetrativeness are formed. Magma and hydrothermal fluids are constantly rising along them and complex volcanic structures differing in polyorifice volcanicity and presence of extrusive domes of dacite and rhyolite composition are formed on the surface. Thermal manifestations are usually located within boundary of such structures and around them. It is shown that lateral displacement of hydrotherms relative to these structures is connected with inclination of faults bounding troughs of the basement. Sometimes it is directed to the side of rise of fault planes.

References

Leonov V.L. Regional structural position of high temperature hydrothermal systems of Kamchatka // Proceedings World Geothermal Congress 2000, Japan, p. 1377-1382.