



Geothermal investigations in Kun-1 borehole (Kunashir island)

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Borehole Kun-1 (Kunashir island, Russian Far East) was drilled to a depth of 300 m in 2000 for water level observation and earthquake prediction. Borehole penetrates volcano-sedimentary rocks to a depth of 270 m; below this depth, it passes through marine sedimentary rocks (argillites, sandstones). Geothermal investigations were started in September 2006, when 8-channel temperature logger was installed. During the year temperature registration were performed each 30 min in air, soil (0.2, 0.4, 0.6, 0.8 m) and in the borehole (10, 20, 40, 60 m). In September 2007 this logger was replaced by 16-channel logger with “air” (1.7 m), “soil” (0.07, 0.37, 1.07 m) and “borehole” (20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 220, 240 m) probes.

In the report we present first results of this investigation including temperature-depth distribution, GSTH – reconstruction, influence of paleoclimate and water flow on the underground temperatures, temporal variation of temperature at different depth, water level change. GSTH reconstruction shows a soil warming of 2-3K since 1940th contrary to the slight decreasing of mean annual air temperature. Temperature variation caused mainly by water flow behind casing, which connected in turn with tidal influence, tectonic regime, and other factors. Temperature variation at 60 m does not exceed 0.2 K. It was discovered a phenomenon of sudden and sharp switching between two quasi-stable states characterizing by standard deviations $0.017 \pm 0.002\text{K}$ and $0.010 \pm 0.002\text{K}$. Duration of each state lies between 0.5 and 2 month. We suggest this switching determined by change of tectonic regime of the earth’s crust near borehole site.