



Forced Fluid flow in extensional domains

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Geothermal Energy is often exploited in extensional domains. Hence the microseismic monitoring of hydraulic stimulations in geothermal fields provides unique information on forced fluid flow in rock masses submitted to extensional conditions. We discuss results from hydraulic stimulations conducted at Soultz, in the upper Rhine Graben and in Leyte Island, in the Philippines, where the Philippine fault is perpendicular to the minimum principal stress direction, yet undergoes a strike slip motion. At Soultz, results show that depending on the injection pressure, the fluid may migrate upward or downward, depending on whether shear or hydraulic fracturing is the driving fracture mechanism. At Leyte, the injection of water through the fault at a depth of 1800 m, shows that the fault is completely impervious at this location even though it is moving aseismically and continuously at the velocity of 3 cm/y. These results are compared to the growth of microseismic swarms that occurred in the Corinth rift zone, near Aigion, some 40 km west of Patras in western Greece. It is concluded that in Corinth, migration of fluid occurs both downward and upward within the same volume, depending on time. This demonstrates that fluid pressure conditions are not steady in this region located seventy kilometres above a subducting plate that undergoes presently a roll back motion.