

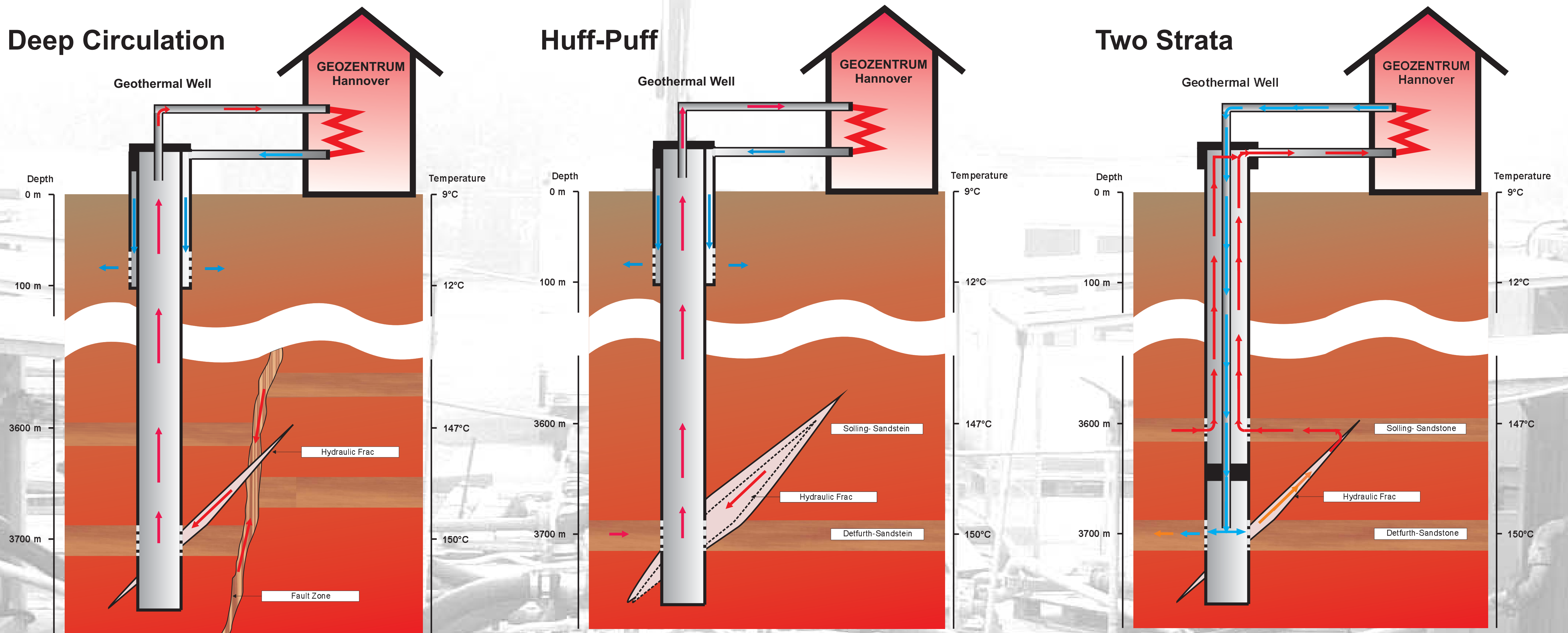
The *GeneSys* Project: Single-Well-Concepts for Deep Geothermal Energy from the Northern German Basin

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Within the GeneSys-Project, the BGR (Federal Institute for Geoscience and Resources) and GGA-Institute (Leibniz Institute for Applied Geoscience) aim at the extraction of deep geothermal energy (3500-4000m) from the tight sediments of the Northern German Basin. Therefore three new concepts for geothermal heat extraction using a single-well-concept have been developed, since drilling costs are a crucial point to the efficiency of geothermal plants. All concepts have been developed for the use in low-permeable sediments, which are supposed to provide heat energy for small to medium-sized consumers in the order of 2MWth.

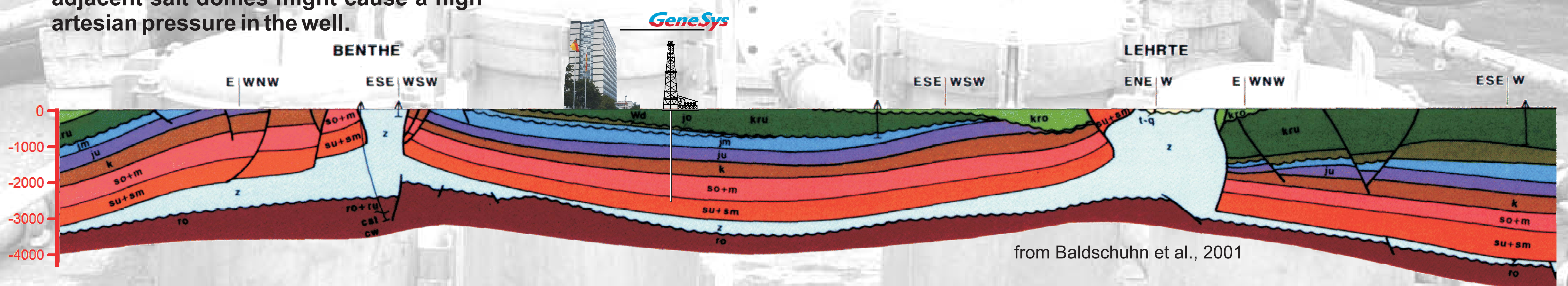


Deep circulation concept: Via a hydraulic fracture a highly permeable geologic fault is connected to the well. Hot water can be withdrawn from the formation.

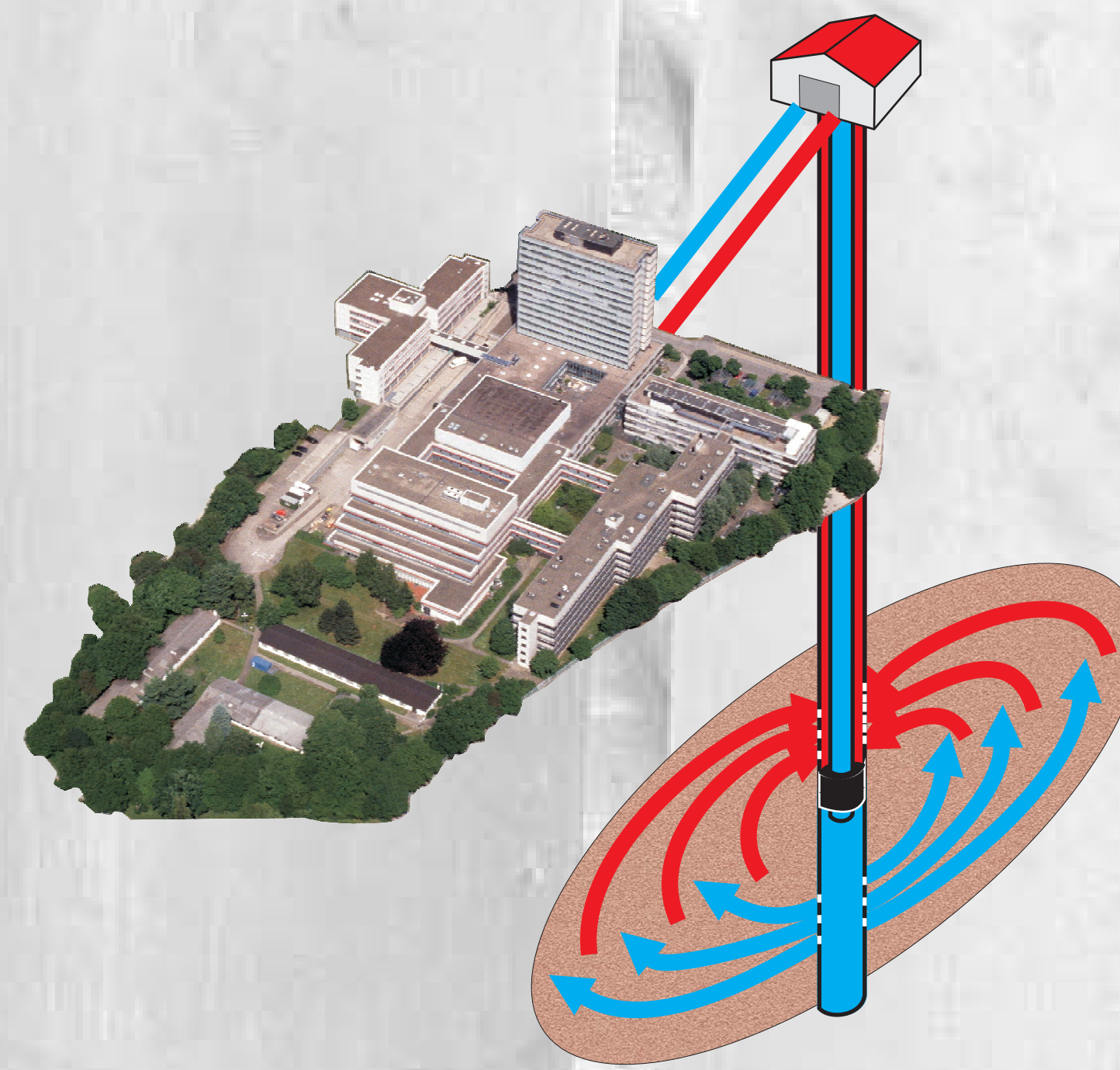
Figure below: geologic profile over the drill site at the GEOZENTRUM. The target formation of the mid-triassic sediments will be found in a depth of approximately 3800 m. Like the tectonic situation in the research well Horstberg Z1, the uplift of adjacent salt domes might cause a high artesian pressure in the well.

“Huff-Puff”-concept: A hydraulic fracture is created, which acts as a storage reservoir for injected cold water. The cold water heats-up and can be produced as necessary. The cycles of injection and production can be adapted to the needs of the consumer e.g. injection during weekend and production during working days or injection in summer and production in winter.

Two-strata concept: A hydraulic fracture connects two strata of sandstones. Both strata are connected to the well. A tubing passing a packer gives access to the lower stratum while the upper stratum is linked via the annulus of the same well. Water is injected into the lower sandstone, heats-up while migrating through the fracture and is produced from the upper sandstone layer. A persisting circulation is established.



Key technology to all concepts is the water-fracturing technique, which is used to create large fractures in the sedimentary rocks. The Huff-Puff and the Two-Strata concept have been successfully applied at the geothermal research well Horstberg Z1 in the Mittlere Buntsandstein formation. (Left: fully equipped geothermal research well Horstberg Z1 in the “Südheide”).



By the end of 2007 a 3800 m deep well will be drilled in the town of Hannover to supply office and laboratory buildings of the GEOZENTRUM with geothermal heat by using single-well concepts. (Left: sketch of the GEOZENTRUM with district heat station and enhanced geothermal reservoir).