as a resource management tool for production fields since it's firs release in 1989. We present a new software tool, Lumpfit++, based on an updated method that can simulate pressure response in systems with multiple production and re-injection wells. For testing and refinement of the software, rich datasets from Eyjafordur N-Iceland and North-Western Poland have been used. The result of this collaboration between Icelandic and Polish partners is a time-efficient workflow and robust tools to perform reliable reservoir modelling in low-temperature fields.

The work presented is a part of project "Optimal management of low-temperature geothermal reservoirs – Polish-Icelandic cooperation on reservoir modelling" (acronym GeoModel), financed under the Fund for Bilateral Relations through the European Economic Area Financial Mechanism (EEA FM) and the Norwegian Financial Mechanism (NFM) 2014-2021.

#44 **Sæunn Halldorsdottir**
Helga Margrét Helgadóttir
Sveinborg Hlíf Gunnarsdóttir
Rögnvaldur Magnússon,
Guðni Axelsson
Bjarni Gautason

Modelling of the Hjalteyri low temperature geothermal system in N-Iceland

The Hjalteyri low-temperature geothermal system is located on the western shore of Eyjafjördur, 20 km north of the town of Akureyri in northern Iceland. The system lacks surface manifestations and
was discovered by chance during a drilling operation for sediment-filtered seawater intended for fish farming. The well revealed a geothermal gradient of 100-110°C/km, leading to further exploration. Hjalteyri is one of Iceland's most productive geothermal fields, capable of yielding around 200 L/s of 90°C hot water with moderate drawdown. Increased hot water consumption of Akureyri and nearby communities has been met by expanded production from the field. However, invasion of saline waters in recent years has raised concerns about the system's long-term sustainability and prompted further research into its characteristics. The source of the system's recharge remains unclear, and its relationship to other geothermal systems in Eyjafjörður, including one on the seafloor northeast of Hjalteyri, is still unknown. To better understand the system and explore potential recharge scenarios, various modelling efforts are currently underway.

The present modelling effort is part of project "Optimal management of low-temperature geothermal reservoirs – Polish-Icelandic cooperation on reservoir modelling" (acronym GeoModel), financed under the Fund for Bilateral Relations through the European Economic Area Financial Mechanism (EEA FM) and the Norwegian Financial Mechanism (NFM) 2014-2021.

#45 **Walter Wheeler**
Jacques Varet, Peter Omenda, Yves Geraud, Pascal Tarits, Sofie Hautot, Timothée DuPaigne, Loris Piolat, Raphael Pik, Jérôme Ammann, Theo Renaud, Alexiane Favier, Bjarte Lønøy, Jan Tveranger, Vetle Risinggård, Kayad Moussa Ahmed, Mohamed Aden, Ismael Ali Gardo, Eugene Karangwa, Gilbert Haganje, Emmanuel Turinimana

The LEAP-RE Geothermal Village project: Geoscience perspective on 4 sites in the EARS

The Geothermal Village project envisions off-grid community-exploitation of shallow geothermal resources, which in Africa are commonly found along the East African Rift System (Varet et al. 2014). Co-funded by the H2020 LEAP-RE program (Grant Agreement 963530), 4 sites were chosen for feasibility studies. This abstract focuses on the resource.

Lake Abhe Village, Djibouti, lies on the E. side of Lake Abhe, on basaltic ridges formed by ENE-trending faults. To the west, on exposed lake beds, fields of hydrothermal chimneys, steam vents and hot springs (71 to 99.7°C) are inferred to form over a buried N-trending fault system bounding the lake basin, consistent with electric resistivity tomography, induced potential and magnetotelluric (ERT, IP, MT) measurements used to map the 3D hydrothermal plumbing. Well doublets would spud on basalt 1km from the fractured-basement target 800m beneath the unconsolidated lake beds, for ~135°C brine, to provide ORC electricity, heat and fresh water.

The Mashyuza hot springs, in Bugarama, Rwanda, lie in the Tanganyika-Kivu accommodation zone. They emit 51°C carbonate-rich water and gas (99%CO2), depositing travertine and carbonate mud in excess of 50m thickness. Flow from natural springs approximately 140l/s; a 60°C shallow source is inferred. The springs are adjacent to a NE-trending oblique-slip fault bounding the N-trending graben. ERT, IP and MT delineate low-resistivity zones inferred to be fluid-rich basement faults. Targeting these zones at 200m depth with doublets would allow high-flow 60° water for direct use while maintaining natural spring heads.

Homa Hills, Kenya, at the NE corner of Lake Victoria, is underlain by a carbonatite volcano complex (12-1.3 Ma). Hot spring temperatures range from 88 to 43°C. Magnetotelluric data identify both shallow (200m) low resistivity by the hot springs (200 m depth) and deep (4 km) low resistivity zones but no connection between. The spring water indicates a deep high temperature (up to 200°C) source. Relatively shallow drilling (500m) for 130° brine should allow village-scale ORC electricity and direct-use heat, likely at several locations.

At Era Boru, Ethiopia, in the Afar triangle, steam emerges from open faults, used for millenia to condense fresh water. IR drone surveys show the hottest areas along fault systems, where drilling to 300m, likely with a modified water-drilling rig, should provide ~150°C steam for electricity as well as direct heat and condensed fresh water.

#46

Giuseppe Mandrone
Anna Katharina Bruestle
Giulia Cittadini
Giulia Conforto
Marek Andrzej Hajto
Stefan Hoyer
Erbs Poulsen Søren
Kai Zosseder

THE EU SAPHEA PROJECT - SAPHEA – ACCELERATING GEOTHERMAL ENERGY INTEGRATION IN HEATING AND COOLING NETWORKS ACROSS EUROPE