



A multi-disciplinary investigation of Irish warm springs and their potential for geothermal energy provision.

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Irish warm springs are one of a set of several target types that are being evaluated for their geothermal energy potential during the course of the island-wide assessment of the geothermal energy potential of Ireland under the IRETherm project (www.iretherm.ie).

There are 42 recorded warm springs in Ireland that can be grouped into two distinct clusters in the east of the Province of Leinster (east-central Ireland) and the central part of the Province of Munster (southern Ireland). Water temperatures measured in these springs (approximately 12°C to 25°C) are elevated with respect to average Irish groundwater temperatures (usually between 10°C and 11°C). This study focuses on the Leinster warm springs, which are situated in the Carboniferous limestone of the Dublin Basin. Geophysical methods (controlled source electromagnetics (CSEM) and audio-magnetotellurics (AMT)) are being utilised in conjunction with hydrochemical analyses to determine the source of the heated waters at depth and the nature of the geological structures that deliver the warm waters to the surface. This will provide the basis for an assessment of the source of these thermal waters as a potential geothermal energy reservoir.

We present our current assessment of existing and available hydrochemical data along with preliminary subsurface models derived from new geophysical data collected by IRETherm during 2012 and 2013. High-resolution AMT surveys at three warm spring locations in Leinster consisted of a grid of 40 soundings recorded at approximately 200 m intervals centred on each spring. A CSEM survey (25 sounding localities with 100 m spacings along two profiles) was also carried out at one of the locations (St. Edmundsbury spring). These surveys aim to image directly any (electrically conductive) fluid conduit systems that may be associated with the springs and to provide an understanding of the observed association of the springs with major structural lineaments, such as the Iapetus Suture Zone that bisects Ireland.

A detailed hydrochemical analysis of several key warm springs in Leinster is currently underway for this study. Groundwater sampling and analysis commenced in June 2013 and will be carried out over six seasons. Results to date are presented.