

Geothermal energy development in Turkey

A. AKPINAR^{1*}, E. AKARYALI² AND M.I. KÖMÜRCÜ³

¹Dept Civil Engn, Gümüşhane Univ, TR-29100, Gümüşhane, Turkey (*correspondence: aakpinar@ktu.edu.tr)

²Dept Geol Engn, Gümüşhane Univ, TR-29100, Gümüşhane, Turkey (eakaryali@gmail.com)

³Dept Civil Engn, Karadeniz Tech. Univ, TR-61080, Trabzon, Turkey (mkomurcu@ktu.edu.tr)

Geothermal energy is a clean and environmentally friendly energy source, as well as it is renewable and sustainable. It can be used in buildings, agriculture, industry, greenhouse heating etc. This energy source is independent of meteorological events such as wind and sun and more economic and reliable than some of the other energy sources.

In this study, historical development of geothermal energy in Turkey and balance of between geothermal potential and consumption are investigated. With this objective, the studies which have been started by General Directorate of Mineral Research & Exploration (MTA) in 1960's are examined. At the result of these studies, it was determined that, 170 numbers geothermal areas which have low and middle heat were discovered by MTA until 2000. The performed studies have shown that probable geothermal energy potential in Turkey is 31500 MWt for direct use and 4500 MWe for electric production [1]. However, the present use of geothermal energy is a very small fraction of the identified geothermal potential. Only 7% of the geothermal source potential of Turkey was used so far [2]. When Turkey uses the entire total geothermal potential, it can meet 14% of the total energy needs (head and electricity) [3]. This implies a very thought-provoking figure for Turkey which depends greatly on foreign thermal resources. For sustainable development in Turkey, it is very important to increase this percentage to upper values.

[1] Kömürcü, A., and Akpınar, A., 2009, Importance of geothermal energy and its environmental effects in Turkey, *Renewable Energy*, **34**, 1611-1615. [2] Geothermal Association of Turkey (GAT), Geothermal Energy in Turkey, <http://www.jeotermaldernegi.org.tr/> (in Turkish). [3] Akpınar, A., Kömürcü, M.I., Önsoy, H., Kaygusuz, K., 2008, Status of geothermal energy amongst Turkey's energy sources, *Renewable and Sustainable Energy Reviews*, **12**, 1148-1161.

Assessing organic carbon distribution in the Koiliaris critical zone catchment (Greece) by using geostatistical techniques

E. AKSOY^{1*}, P. PANAGOS¹, N. NIKOLAIDIS² AND L. MONTANARELLA¹

¹Joint Research Center of the European Commission Institute for Environment and Sustainability, Via E.Fermi, 2749, 21027 Ispra, VA, Italy

(*correspondence: ece.aksoy@jrc.ec.europa.eu, panos.panagos@jrc.ec.europa.eu, luca.montanarella@jrc.ec.europa.eu)

³Department of Environmental Engineering, Technical University of Crete, 73100 Chania, Greece (nikolaos.nikolaidis@enveng.tuc.gr)

Organic carbon amount of the soil is one of the most important geochemical parameters for defining soil characterization. It affects directly to the soil functions (biomass production, C sequestration, biodiversity, etc.) and problems about it may finalize as soil threats. Because of these reasons accuracy of the distribution assessment is an important topic.

This study implemented in Koiliaris Catchment Critical Zone, in Greece with an aim of accurate and detailed assessment of organic carbon distribution. Slope and aspect from DEM; CORINE landcover classification; geological formations and WRB soil classification information were used as covariates in this study. All layers were in the raster format with 100m resolution and the sample points has measured organic carbon values from Crete University field work. Regression – Kriging geostatistical technique was used to be able to find the distribution of the organic carbon through the catchment. As a conclusion, significant correlation between the covariates and the organic carbon dependent variable was found and organic carbon distribution map of Koiliaris CZ was produced in the digital soil mapping perspective.