Use of Iodine for Petroleum Exploration

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ABSTRACT

Iodine is highly mobile so is transient and highly variable in concentrations the soil environment. These increased concentrations of iodine and bromine are often associated with oil and gas fields; however, there is a debate as to whether the halogens migrate with the hydrocarbons or are already present in the soil and what process causes the halogen association with the hydrocarbons. Nevertheless, surface geochemical surveys of iodine concentrations have been used as a pathfinder™ for locating oil and/or gas accumulations for more than 40 years. Background values of iodine appear to range from 0.1 to 15 ppm while anomalous concentrations appear to range from approximately 3.5 to 10.5 ppm, which would be one to two standard deviations from the mean. Iodine surveys have been conducted in many regions of the US including: 1) California, 2) Rocky Mountain, 3) Texas, 4) Mid-West, and the 5) Appalachian Basin. One survey has been reported from the Thrace Basin in the European portion of Turkey. The wide range of geologic and climatic regions that iodine surveys have been used in suggests that they can be an effective exploration method, but the data do not provide any type of correlation between positive results and exploration success. One advantage of this exploration method is that one person can collect samples using a standard soil probe, so the method is quick and cost-effective. Tedesco (1995) suggests that the use of the iodine surveys along with other exploration methods can increase the exploration success rate by about 25 percent. Leaver and Thomasson (2002) used crosstab plots and Chi-square statistics to suggest that the association between iodine anomalies and oil and gas fields is not random.