Groundwater Contamination

IAHS-AGU 1989 Symposium

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This symposium was held May 11-12. Sessions were jointly sponsored by AGU and the International Association of Hydrological Sciences. Forty-two papers were presented over the 2 days, and session participants included AGU members from many regions of North America and IAHS members from 12 nations. The symposium was divided into three consecutive topical sessions: physical, chemical, and biological processses governing transport; aquifer rehabilitation and case studies; and aquifer degradation due to agricultural practices and nonpoint sources.

The first session, which lasted a full day, drew an excellent attendance of more than 150 people. Session papers covered a broad range of topics dealing with contaminant transport, including the investigation and modeling of dispersion; density effects and wetting front instabilities; multiphase organic chemical migration; in situ biotransformation of contaminants; and investigating and modeling chemical transformations. Both field and laboratory studies were presented. In addition, a number of new research areas were highlighted. These included transport of bacteria, nonaqueous phase mass transfer to flowing groundwater, and chemical causes of groundwater movement.

The second session focused on aquifer remediation and was attended by about 100 people. Experience with a number of aquifer rehabilitation approaches was examined. These approaches include hydraulic methods, such as purge wells, drains, trenches and slurry walls, as well as biorestoration and in situ vitrification. The influence of aquifer properties such as oxidation-reduction and sorption capacities on remediation methods was also explored. Another theme of the session was the optimization of remediation strategy under conditions of parameter uncertainty. The impact of data collection costs and data feedback on optimal strategy was considered.

The final session, attended by about 50 people, began with a thought-provoking keynote address by Donald R. Nielsen of the University of California, Davis. Many of the complexities of dealing with unsaturated zone transport were highlighted, and the importance of an interdisciplinary treatment of the problem was stressed. This talk was followed by several papers dealing with the modeling and management of the impact of agricultural practices on groundwater quality. The session closed with case histories of such impacts from a number of places around the world; the influences of formation chemistry and of nonpoint sources on water quality were addressed.

Papers from the IAHS contributors to this symposium have been published as *IAHS Publ. 185*. This volume includes 22 papers. Abstracts of the remaining presentations can be found in *Eos* (April 11).

This report was contributed by Linda M. Abriola, University of Michigan, Ann Arbor.

The GP Compass

The GP Compass: *The focal point for the geomagnetic and paleomagnetic community.*

Geomagnetic Paleointensity

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Paleointensity is the variations in magnitude of the geomagnetic field in the near and remote past. Similar to paleodirectional studies, paleointensity research depends on the ability of a rock to preserve for a geologically long time the information related to the ambient magnetic field existing at the time the rock was formed.

Paleointensity determination is difficult because a *quantitative* relation should exist between the field strength and the remanent magnetization acquired in it. In contrast, for ordinary paleomagnetic studies seeking the direction of the paleofield, only a *qualitative* relation that the remanence direction is parallel to the magnetic field is required.

Even if a quantitative relation existed between the magnetic field and the natural remanent magnetization (NRM), many factors affect this relation during the long time since the acquisition of the remanence. This complicates the situation and necessitates some means to examine the consistency of the data. Thanks to the efforts of many researchers, some of the techniques used in paleointensity studies have attained a high degree of reliability and we may obtain data satisfactory for many purposes including comparison of the behaviors of various dynamo models.

In this report I summarize the present status of paleointensity studies: the methods, their reliability, and applicability to other areas of geomagnetic field studies. Actual data analysis is not intended since there are some good reviews summarizing available data, for example, *McElhinny and Senanayake* [1982] and *McFadden and McElhinny* [1982].

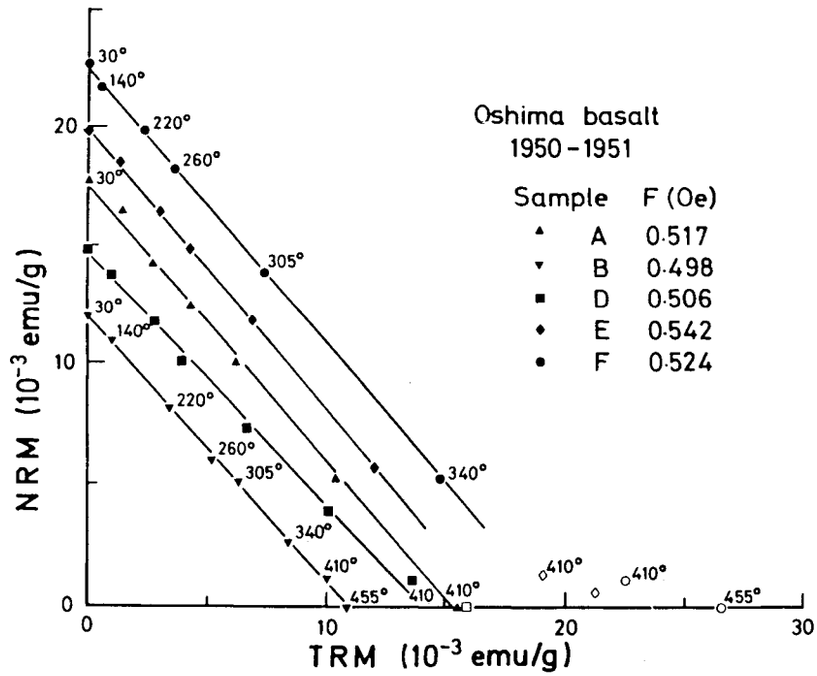

Fig. 1. An example of Thelliers' method of paleointensity determination. The abscissa and ordinate indicate the magnitudes of PTRM gained and NRM remaining at a particular heating temperature. The gradient of the linear relation gives the ratio of the ancient and the laboratory magnetic field (from *Kono*, 1979).