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Pure and Applied Geophysics

Introduction

Terrestrial Fluids, Earthquakes and Volcanoes: The Hiroshi Wakita Volume II is a special publication to honor Professor Hiroshi Wakita for his scientific contributions to science and to commemorate his 10th anniversary as Emeritus Professor at the University of Tokyo. The volume II consists of 10 original papers written by researchers from Japan, Germany, Italy, Costa Rica, Sweden, El Salvador, Turkey, USA, Greece, and Spain dealing with various aspects of the role of terrestrial fluids in earthquake and volcanic processes which reflect Prof. Wakita's wide scope of research interests. The Pure and Applied Geophysics "*Terrestrial Fluids, Earthquakes and Volcanoes: The Hiroshi Wakita Volume I*" published 17 scientific contributions in May 2006, and the volume III will be published in January 2008. These Pure and Applied Geophysics Hiroshi Wakita volumes should be useful for active researchers in the subject field, and graduate students who wish to become acquainted with them.

Professor Wakita founded the Laboratory for Earthquake Chemistry in April 1978 with the aim of establishing a scientific base for earthquake prediction by means of geochemical studies, and served as its director from 1988 until his retirement from the university in 1997. He has made the laboratory a leading world center for studying earthquakes and volcanic activities by means of geochemical and hydrological methods. Together with his research team and numerous foreign guest researchers that he attracted, he has made many significant contributions in the above-mentioned scientific fields of interest. This achievement is a testimony for not only his scientific talent, but also his enthusiasm, his openmindedness, and his drive in obtaining both human and financial support.

The ten contributions of this volume II are arranged into two groups. The first group of five papers deals with movement and signatures of terrestrial fluids related to earthquakes. The first two papers are related to groundwater-level observations in Japan. The paper by MATSUMOTO *et al*. describes groundwater-level anomalies associated with a hypothetical preslip prior to the anticipated M8 Tokai earthquake, and evaluates the detectability of the anomalies using data from seven groundwater wells. The paper by ITABA and KOIZUMI analyzed groundwater-level data recorded at the Dogo hot spring, one of the oldest and most famous hot springs in Japan, immediately after the 1946 Nankai earthquake and during the period from 1985 to 2006. The following contribution is a paper by FAVARA *et al*. which describes the observed hydro-geochemical changes in warm

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springs and cold discharges located in Central-Northern Sicily related to a moderate seismic activity. Poroelastic aquifer contraction, shaking-induced dilatancy theory as well as seismogenetic-induced changes in aquifers' properties have been proposed as possible mechanisms for the observed changes. The paper by PÉREZ *et al.* describes the detection of precursory geochemical signatures of radon degassing from a bubbling CO_2-rich gas spot in the subsurface several months prior to the 2004 seismic crisis in Tenerife, Canary Islands (Spain). The material Failure Forecast Method was applied by the authors on this geochemical observation to forecast the largest seismic event of the crisis. The last earthquake-related contribution of this special volume is a paper by DOGAN *et al.* which describes diffuse H_2 and CO_2 degassing surveys performed along seven active faults and around the aftershock region of the 2000 Tottori-ken Seibu earthquake in Japan.

This earthquake-related paper is then followed by five additional contributions dealing with observations related to volcanic processes. The paper by MELIÁN *et al.* describes the use of diffuse H_2 degassing surveys as a potential geochemical tool for the volcanic surveillance at Poás volcano (Costa Rica, Central America) after evaluating the results of the 2000–2003 monitoring period. The following paper by OLMOS *et al.* presents the observed anomalous SO_2 emission values prior the 2005 eruption of Santa Ana volcano (El Salvador, Central America) which were recorded by a mini-DOAS (miniaturized - Differential Optical Absorption Spectroscopy) in a mobile-terrestrial position. Additional premonitory signatures of the recent eruption of Santa Ana volcano are described by HERNÁNDEZ *et al.*'s paper through thermal infrared images of its summit crater. A significant increase in the extent and intensity of the fumarolic field inside the crater rim and of the surface temperature of the crater's lake was observed prior to the 2005 eruption as well as changes in the estimated energy input. The following paper by GIAMMANCO *et al.* performs a statistical analysis (Cluster Analysis) of major, minor and trace elements in groundwaters from Mt. Etna volcano which were collected in 1994, 1995 and 1997. The observed changes were basically interpreted as a result of the different response of dissolved chemical elements to changes in the aqueous environment and/or in their solubility/mobility in water due to different rates of input of magmatic gases to Etna's aquifers. The last volcano-related contribution of this volume II is written by TESCHNER *et al.*, and they describe the installation and long-term operation of a system for continuous monitoring of fumarolic gases at Nysiros volcano in Greece.

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Nemesio M. Pérez
Environmental Research Division
Instituto Tecnológico y de Energías
Renovables (ITER)
Tenerife, Canary Islands
Spain

Sergio Gurrieri
Istituto Nazionale di Geofisica e
Vulcanologia
V. Ugo La Malfa
153 - 90146 Palermo
Italy

Chi-Yu King
Earthquake Prediction Research, Inc.
381 Hawthorne Ave
Los Altos, CA 94022
USA

Yuri Taran
Institute of Geophysics
Universidad Nacional Autónoma
de México (UNAM)
Mexico D.F 04510
Mexico

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