Phil Schmidt

Grahame Sands Award

Perth February 2015

CITATION (PREVIEW):

This award is based on an endowment made by members of the ASEG and the geoscience profession in memory of the late Grahame Sands, who was tragically killed at the prime of his life in an aircraft crash in 1986, whilst developing and testing new equipment for geophysical survey aircraft. Because of Grahame's abilities to turn scientific theory into innovative application, the award is made for innovation in applied geophysics through a significant practical development of benefit to Australian exploration geophysics in the field of instrumentation, data acquisition, interpretation or theory.

The Grahame Sands Award for 2015 is made to Phil Schmidt from MagneticEarth Pty Ltd for his unique and practical development of the Qmeter for in-field measurement of the magnetic remanence properties of field samples. The Qmeter provides geophysicists with a practical and affordable method for investigating the magnetic remanence and magnetic susceptibility properties of field samples collected from outcrop, drill core, mine open cuts and quarries.

Phil is an adjunct Professor at Macquarie University, NSW, and an Honorary Fellow at CSIRO. Since 2005, he has been a member of the Federal Executive of the ASEG. As Publications Chairman during that time he has been instrumental in raising the profile of ASEG's publications *Exploration Geophysics* and *Preview.*

The development of the Qmeter is the result of years of investigation of the magnetic properties of rocks, their relationship to mineralization systems and theoretical methods for the analysis of field data. Phil has made a significant contribution to our knowledge of the magnetic properties of many mineralization systems through his prior research at CSIRO and collaboration with other global research organizations, and through more than 120 professional publications that he has authored or coauthored ranging from rock magnetism, instrumentation and magnetic survey interpretation to palaeomagnetism.

The Qmeter was developed from the concept first published in 1973 by Sheldon Breiner in a booklet entitled "Applications manual for portable magnetometers" as a practical field guide for total field magnetometers. Phil has adapted the hand held method suggested by Breiner and turned it into a practical portable system that uses a miniature flux gate magnetometer and associated electronics that is directly powered from the USB port on a laptop computer. The new theoretical development required for use with the flux gate magnetometer is published in the ASEG special publication on magnetic remanence and demagnetization: Schmidt, P.W. and Lackie, M.A. 2014, Practical considerations: making measurements of susceptibility, remanence and Q in the field (*Exploration Geophysics* 45(4) 2014)

The Qmeter is an elegant and simple machine which fills an important niche. Interpretation of aeromagnetic surveys have often made the simplifying assumption that anomalies are produced only by induced magnetic fields proportional to the magnetic susceptibility, a property which can be readily measured in the field with small simple instruments. The fact is however that most rocks, and especially economically interesting rocks, hold a permanent or remanent magnetization as well as their induced magnetization. For the companies that do recognize the importance of remanence, current practice is to submit rocks to laboratories, with significant time and cost factors involved.

The Qmeter is an inexpensive instrument which permits rapid measurement of magnetic susceptibility and remanence in the field. The hope is that by making it possible for companies to produce their own magnetic remanence data in real time during exploration, they will perform more complete and realistic magnetic survey interpretations, leading to more efficient and successful discovery strategies.

Given the emergence of magnetic remanence as an important rock property for assisting in the exploration of many mineralisation systems, Phil's development of the Qmeter is a significant step forward by providing geophysicists with a practical tool for the direct field measurement of the magnetic remanence properties of rock samples. The ASEG is pleased to present the Grahame Sands Award to Phil Schmidt in recognition of this unique and practical contribution to our industry.