Pergamon

*Journal of Structural Geology*, Vol. 20, No. 2/3, p. v, 1998

Printed in Great Britain

# Preface

This collection of 15 papers includes some of those presented at an international conference on the structure and properties of high strain zones in rocks, held during early September 1996 at Verbania-Pallanza, on the shores of Lago Maggiore in northern Italy. This scenically spectacular venue lies in the inner arc of the western Alps, and was the focus of a number of post-conference field excursions, days that were additionally memorable for their exceptionally fine weather. The conference aimed to bring together not only geologists working on highly strained rocks in the field, but also those studying microstructures, fabric development, experimental rock mechanics and numerical modelling, and geophysicists concerned with both the small-scale physical (e.g. seismic) properties of highly strained rocks and geophysical studies at crustal scale. Although the papers collected here are only a fraction of those presented at the conference, their scope is sufficient to give a feeling for all the themes of this meeting.

The Special Issue begins with field-based studies of rocks in high strain zones from Norway (Roberts), Sardinia (Conti *et al.*) and the western Alps (Guermani and Pennacchioni), and of strain localization in Antarctic continental ice (Marmo and Wilson). Three papers follow on different aspects of microstructural studies of naturally deformed rocks: stress gradients around porphyroclasts (Kenkmann and Dresen), mass transfer associated with mylonitization (Hippertt), and microstructures in peridodite and their implications for shear localization in the lithosphere (Jin and Karato). There is growing interest in the role of shear zones as conduits for crustal melts, and in the role of melts in the localization of high strain zones, and two papers address some of these issues (Brown and Solar, Kisters *et al.*) with natural examples. Turning to the laboratory, the application of novel methods of experimental rock mechanics to the flow of rocks at high strains has only recently begun to be addressed seriously. Papers by Rutter and Casey *et al.*, respectively, use extension and torsion testing to induce high strain deformation in calcite rocks in order to extract mechanical properties and fabric information. Using experimentally deformed quartzite, Takahashi *et al.* demonstrate the potential use of grain boundary microstructure as an index of conditions of rock deformation. The relationships between seismic properties and preferred crystallographic orientation in highly strained rocks is the subject of papers by Burlini *et al.* and by Khazanehdari *et al.* The Special Issue ends with an overview and evaluation of different continuum mechanics approaches to the prediction of fault patterns, by Gerbault *et al.*

*E. H. Rutter, A. Boriani, K. H. Brodie, L. Burlini and S. H. Treagus*