Preface

This book represents a rather complicated history of encounters, changes in research interest and some very interesting results. Initially it is the very fruitful interaction of Ecology and Geology. The point of view of ecologists is extremely refreshing for hard science people. Interaction and inter-relationships are the focus of Ecology whereas the traditional sciences, such as Geology, have tried to isolate the natural phenomena so that thye could be studied in a more rigorous manner.

The traditional sciences were of course natural science – based since the world to be observed was at the door step of everyone, mountains, weather patterns, plants and so forth. Chemistry and Physics were defined after Mathematics in order to establish more precise and viable principles of the behavior of the materials that formed the world around mankind. It became quite clear that the observation of the natural world was too complicated to consider all of the possible variables which could affect an observed process or situation. The systems were simplified and taken into the laboratory in order to better master the phenomena observed. Physics concerned itself with non-reacting materials, subjected to essentially mechanical forces. Chemistry was given the task of understanding the interactions and transmutations of matter according to the affinities of atoms and ions. As it turned out the interactions of electrons was the key to the chemical problem. In these endeavors, the systems were simplified to better understand the fundamental principles. However nature remains a multidimensional problem and although great progress has been made using the discoveries of Chemistry and Physics to understand the underlying principles of phenomena in natural systems, much escapes still.

One of the major problems today in the study of the earth’s surface: contact between rock, plant and atmosphere, is the understanding of the interactions and influences possible in this zone of intersection of phenomenological forces. For example, most mineralogists concerned with clays, those silicates present and active in the surface zone, feel that the influence of the bio-zone is only negative, one of destruction and dissolution, being part of the general degradation of silicate materials by surface interactions. Plants and bio-agents are generally considered to be classified in the alteration category such as that encountered in the contact of rain water with rocks. However, numerous, little heard authors have insisted for quite some time, over a hundred years, that the interactions can be important and transfer of materials from depth to the surface can condition the soil, interaction zone.
Plants, minerals, bio-agents such as micorrhize and bacteria all interact to form a living community, in the Ecological sense.

The interaction of the sphere of living materials (plants and bio-agents) with the slowly reacting and stable silicate (rock) material under the influence of climate (rain) are the subject of this new approach to science at the surface of the earth.

We would like to thank our many collaborators for their enthusiastic help, from various parts of China, to the United States and Canada and parts of Europe. It is clear that Science is a world venture, and a pleasure to be part of.

Closer to us, our colleagues in our laboratory and the technical staff without which we would be more or less helpless, have been a great inspiration during the preparation of this book and the scientific studies that have led up to its expression. No one is alone in this complex modern world. We wish to thank all of those who have contributed to our efforts.

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Bruce Velde
Pierre Barré
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