Geophysical Research Abstracts, Vol. 8, 04527, 2006
SRef-ID: 1607-7962/gra/EGU06-A-04527

Modeling of carbonate surfaces

E. Jettestuen, B. Jamtveit, Y. Y. Podladchikov, S. deVilliers, H. E. F. Amundsen
Physics of Geological Processes, University of Oslo, Norway

Mineral agregates often show complex internal growth structure and surface morphologies on a variety of lengthscales. Examples range from spherulitic or 'botryoidal' carbonates to stromatolites and travertine terraces. A proper understanding of such precipitation patterns is important because these surfaces not only reflect the kinetics of mineral precipitation, but also often represent the interface across which the geosphere interacts with the hydrosphere and biosphere. In addition to understanding the underlying physics of such processes, there can also be challenges in determining how to adequatly characterize these surfaces

We study the surface of a naturally grown carbonate. Although the surface looks rough to the eye it has a trivial scaling behavior. Thus we can not make any judgment on its generic behavior based on its scaling. However, the growth surface as well as the observed internal structure has many similarities to the structure generated by a normal growth model. We show how an accurate fit of the carbonate surface can be achieved by adding nucleation sites during a background of constant normal growth. Pertinent characteristics of the natural internal structure are also displayed. Using the assumption that a normal growth process is appropriate for the evolution of the carbonate surface we can explore the role of nucleation during the growth process.