Northeastern Geology & Environmental Sciences **ABSTRACTS, volume 23, number 3, 2001**

LIKELY NON-GLACIAL ORIGIN OF SANDSTONE CLASTS IN A GLACIAL LAKE DEPOSIT: THE CARMICHAELS FORMATION, WESTERN PENNSYLVANIA

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ABSTRACT: The Carmichaels Formation in western Pennsylvania is a unit of Pleistocene lacustrine deposits of clay, silt, and sand matrix within which are embedded cobble to boulder-size, chiefly quartzarenite clasts. Deposition took place in Lake Monongahela, which was created by glacial damming of regional drainages. Field and laboratory observations suggest that Carmichaels clasts were derived from an unglaciated bedrock source. Clasts from Carmichaels deposits along the Conemaugh River east of Pittsburgh were compared with clasts from channel deposits of modern age in tributaries of this river on the basis of macro- and microscopic traits. Both populations consist almost exclusively of silica-cemented quartzarenites with very similar proportions of mono- and polycrystalline quartz types and distributions among classes of size, rounding and shape. Exposures of the Lower Pennsylvanian Pottsville Group in anticlines to the east of the study area contain thickly-bedded quartzarenites and are the most likely sources. The Lower Pennsylvanian Allegheny Group is exposed in the same area and contains some quartzarenite facies; it may have also contributed. Derivation of the clasts from other bedrock units in the region, or from more distant sources via ice sheet transport, is unlikely. The former consist largely of micaceous feldspathic sandstones, siltstones and mudstones, and till and outwash deposits in western Pennsylvania contain igneous and metamorphic rocks. None of these rock types have been observed among Carmichaels Formation clasts.

Possible transport mechanisms from source rock to lake bed include ice rafting, floods and debris flows.

NATURE, ORIGIN, DIAGENETIC HISTORY, AND GEOCHEMISTRY OF THE BEEKMANTOWN-GROUP DOLOMITES (SAUK SEQUENCE) OF NEW YORK

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ABSTRACT: Petrographic investigation using a cathodoluminescent microscope and an electron microprobe for selected dolomite samples from the Beekmantown Group reveals six dolomite textures. These dolomite textures have been classified based on crystal sizes, shapes, uniformity and

trace-element distribution. These textures are as follows: 1) unimodal, very finely crystalline, planar-e (euhedral) dolomite, 2) unimodal, very finely crystalline, planar-s (subhedral) dolomite, 3) medium to coarsely crystalline, planar-e (euhedral) dolomite, 4) coarsely crystalline, non-planar dolomite (non saddle dolomite), 5) very coarsely crystalline, non-planar dolomite (saddle dolomite), and 6) polymodal dolomite.

Petrographic analysis of the selected Beekmantown dolomite samples records a timing sequence of diagenesis as follows: 1) deposition of the original sediments; 2) dolomitization; 3) silicification; 4) chemical compaction (stylolitization); 5) dedolomitization; and 6) precipitation of saddle dolomite (pore-filling dolomite).

SHAKESPEARE GOT IT WRONG. IT'S NOT "TO BE", IT'S "TO DO"!: THE AUTOBIOGRAPHICAL MEMOIRS OF A LUCKY GEOPHYSICIST: PART 4 (FINAL)

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[a preview]

TWELVE: SCIENCE, RELIGION, AND SOME PHILOSOPHY OF SCIENCE

A View Of Science Based On Experience

In this chapter, I report some of the conclusions concerning the nature of science and its relation to other facets of human existence that I have reached as a result of a lifetime of experience in my kind of science. They are mostly things that have come to me as a consequence of the doing and being a part of science, and not nearly so much from reading what others have written about science or the philosophy of science. I do not mean to imply that I have not read such materials, only that what I report here has come to me more or less independently of them. Of course I recognize that others before me have held views similar to mine, and that some, though not all, of my contemporaries and colleagues think as I do. Certainly I intend no claim of priority or originality for any of these matters. I record these views here, not because I think they are new or unique, or necessarily always correct or the optimum, but rather to illustrate the kind of thinking that develops in an individual who has had considerable experience and some success in one kind of science, who has traveled in the higher levels of the scientific community, and who has lived through his career to date in the manner described elsewhere in this document.

LATERAL AND STRATIGRAPHIC DISTRIBUTION OF SEDIMENTARY ORGANIC MATTER IN MIOCENE PROGRADING SEDIMENTS (ODP LEG 174A, NEW JERSEY PASSIVE MARGIN, USA)

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ABSTRACT: The distribution and transport processes of sedimentary organic matter (or

palynofacies) have been studied on the prograding, siliciclastic, passive margin of New Jersey. The two sites 1072 and 1073 of ODP Leg 174A tested Miocene-Pliocene sections, which provide a proximal-distal transect from shelf (site 1072) to slope (site 1073). The lateral and vertical distributions of palynofacies parameters (essentially continental phytoclasts, and continental and marine palynomorphs) can be compared with seismic, gamma-ray and total organic carbon (TOC) data, thereby contributing to the multidisciplinary study of this margin.

Palynofacies at both locations is dominated by continental constitutents. In order to evaluate proximal-distal trends, the main palynofacies parameter used is the ratio of continental to marine palynomorphs (CONT/MAR ratio). The vertical variations of this ratio permit the distinction of intervals which can be equated with seismic sequences. Within a set of prograding clinoforms (e.g. highstand deposits), the CONT/MAR ratio is higher on the shelf than on the slope. On the shelf, its vertical distribution is fairly stable but enables the distinction of aggraded parasequences. On the slope, the ratio shows an upward increase associated with the overall progradation. In transgressive intervals marked by retrogradation, the ratio decreases on both shelf and slope. At both locations, the TOC content is directly linked to the influx of continental phyt lasts and its stratigraphic variations are similar to those of the CONT/MAR ratio. TOC values are lower on the shelf than on the slope because of mineral dilution. Finally, in the prograding sediments, the parallelism between the gamma-ray and CONT/MAR ratio curves supports the hypothesis that the hydrodynamic behavior of continental organic matter is close to that of clay/silt-size particles.