Using The Fluvial-Lacustrine Interface In A Glaciodeltaic Deposit To Redefine The Valparaiso Moraine, Berrien County, Michigan, USA

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ABSTRACT

The Valparaiso Moraine in Berrien County, Michigan, USA, is made up of a continuum of land forms, grading from ice to fine sand sediment. The composition of the Valparaiso Moraine from a highly undulating ice margin, rather than the single, linear margin shown on older maps.

Deltaic glaciofluvial plains of Lake Madron grade from 256 m altitude to distal distributary plains at 241 m, controlled by the Valparaiso morainic system in eastern Berrien County, southwestern Michigan.

BACKGROUND

Mapping Pleistocene deposits has the advantage that, due to their recent deposits, they retain much of the original topography. Hence, morphology has played a role in the development of glacial geology. This has been a bane as well, since one of the problems plaguing glacial geology is our historic legacy of using morphology as a proxy for stratigraphy. Leverett and Taylor (1915) and Martin (1955) argued that the moraines could be traced from sub-ice to the ice contact. The use of a largely topographic classification led Leverett and Taylor (1915) and Martin (1955) to recognize that glacial landforms appeared organized together in a genetic sequence, which called these associations of features “sequences” (Jahns, 1941, p. 100), in the sense that landforms could be related to each other based on the principle of superposition. Glacial deposits were determined by mapping the locations of landforms, their contact surfaces, and related facies. Leverett and Taylor (1915) and Martin (1955) argued that this was an “unfortunate” (Koteff, 1974, p. 122), due to the extant use of the word in a different context.

MORPHOSEQUENCE CONCEPT

As can be deduced from the previous discussion, the key features of the idealized sequences are: (1) whether it begins in contact with the ice and the extant distribution of fine sand and lacustrine silt. Of more importance are the minimal scale of the sequences. Jahns (1941) suggested that drawing profiles of outwash plains at a vertical exaggeration of 20 would readily identify the forms of the sequence and show the position of features. This does not always require mapping outwash plains at the scale of the sequence. "...basal plains..." represent the lower segment of the sequence, which should be used to identify the position of features. The main source of water and sediment transfer out of the ice is the subglacial drainage. However, this does not alter the utility of the morainic sequence.

APPLICATION TO BERRIEN COUNTY

Previous maps of moraines in Berrien County

Fluvial-lacustrine interface

Fine sandy silt eolian loess deposit

Sand and gravel glaciodeltaic facies

Forest bed

Topset sand and gravel lining unformly above bottomset lacustrine silt. Yields minimum lake level.

FOR REFERENCE


REFERENCES:


