OPTIONS FOR MANAGEMENT OF DYNAMIC ICE BREAKUP ON THE CONNECTICUT RIVER NEAR WINDSOR, VERMONT

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The Cornish-Windsor bridge is the longest covered bridge in the United States and has significant historical value. At a large peak flow, dynamic ice breakup of the Connecticut River can threaten the bridge and cause flood damage in the town of Windsor, Vermont. Throughout the 1985-86 winter we regularly monitored ice conditions, including a midwinter dynamic ice breakup on 27 January. We conducted controlled release tests over the operating range of the turbines at Wilder Dam upstream during both open water and ice cover conditions. These data and observations were analyzed in light of more than 60 years of temperature and discharge records. Our analysis indicates that river regulation presents alternatives for ice management that would minimize the probability of bridge damage and flooding during breakup. The flow can be regulated early in the winter to promote the growth of a stable ice cover, minimizing the total ice production in the reach. In the weeks prior to breakup, sustained releases and above-freezing air temperatures cause melting, weakening and gradual breakup of the ice, greatly reducing the flooding potential. Also, it is possible to produce a controlled ice breakup prior to an imminint natural event at lower stage and discharge than now occurs during major events. All of these ice control alternatives have associated power production costs.

RECENT SLUMP-EARTHFLOW IN THE BOUQUET RIVER VALLEY NEAR WHALLONSBURG, ESSEX COUNTY, NEW YORK

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The Bouquet River Valley between the villages of Whallonsburg and Bouquet has a history of landslide activity. The most recent occurrence followed a light rainstorm on 28 July, 1987 when a 0.9 ha slump-earthflow developed in Pleistocene lacustrine sediment.

The crown of the slump is 115 m in length and 16 m above stream level with 7.5 m maximum vertical displacement along the headscarp. A 0.2 ha compression toe bulge, composed of highly plastic clay and alluvial sediment, was raised to a maximum height of 7 m above stream level. The bulge temporarily blocked the stream channel causing a 3 m deep back-water. Erosion of the clay dam initiated small-scale post-slide movements in the toe area.

The slump exposed 0.6 m of outwash over a thick sequence of glacio-lacustrine silt and clay at the headscarp. The lake sediment consists of rhythmically laminated clay and clayey silt. The clays are characterized by high natural water content with low bulk density and shear strength. The upper 2.5 m lacustrine sequence has higher silt to clay ratios and shows evidence of desiccation-consolidation and weathering. Bedrock occurs at depths ranging from 10 m beneath the toe to 24 m beneath the crown as determined from seismic refraction techniques.

Reconstructions, based upon slide-deposit morphometry, suggest that most of the movement occurred as a single mass characterized by head-scarp slumping with thrusting and plastic flow of clay at the toe. Secondary movements related to loss of confining stress were restricted to the headscarp area. Although the movement may have been rainstorm induced, the actual cause is probably related to long-term cutbank erosion at the slope base and pore pressure conditions at the clay-bedrock contact.

THE PALEOENVIRONMENTAL AND STRATIGRAPHIC SIGNIFICANCE OF CHERTIFIED OOIDS IN THE CLARENDON SPRINGS DOLOMITE (UPPER CAMBRIAN), MILTON, VERMONT

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Recently discovered ooid grainstones in the Clarendon Springs dolostone, Milton, Vermont, furnish detailed information about paleoenvironments, current energy, geochemistry and bathymetric configurations of the platform margin of Laurentia during the Upper Cambrian.

The ooids occur as dense decameter scale accumulations surrounded by sucrosic dolomite. Ooids compose 100 percent of allochemical constituents, are well founded, moderately well sorted, ellipsoidal and in grain-to-grain contact. Ooid grains are remarkably large (1.0 - 2.5 mm) and exhibit virtually no deformational overprinting. Intergranular porosity is occluded by authigenic megaquartz and dolomite cement. Preferential weathering removal of cement permits the otherwise indistinguishable ooid grains to be seen.

Bioclasts, peloids, ooid fragments and rare quartz sand form ooid nuclei. Ooid cortices are thick and contain perfectly preserved microlaminations. Original aragonite crystal fabrics and early submarine isopachous cement are preserved by chert replacement. Chertification was clearly an early diagenetic phenomenon, predating fabric destroying dolomitization. Idiotopic dolomite is often observed to replace chertified ooids, especially near contacts with dolomite. The presence of relict ooid "ghosts" within surrounding dolomite suggests that progressive replacement of ooids is a significant process.

Textural and sedimentologic similarities with modern and Pleistocene oolites indicate similar formational processes. Like modern ooids, these formed in very shallow, current agitated normal marine waters that existed adjacent to a deep ocean basin. Tidally influenced currents drove cool, deep, CO_2 saturated water onto the shallow platform. Turbulent mixing with warm water expelled CO_2, resulting in $CaCO_3$ supersaturation and precipitation of aragonite on nuclei. Grain motion, burial, exhumation, growth, abrasion, etc., characterized each ooid grain. The ooids formed cross-bedded shoals in less than 20 feet of water. As with modern oolite shoals, these accumulations influenced the local hydrodynamic regime, creating protected leeward environments where finer grained sediments were deposited.

This interpretation provides independent confirmation of the positioning and configuration of the shelf edge (previously interpreted from polymictic debris flow conglomerates) and the existence of shelf marginal sand shoals. This interpretation also suggests that the shelf margin and the nearby shale basin were characterized by separate energy and depositional regimes. Therefore, the contact relation between the Clarendon Springs (shelf) and the Skeels Corners slate (basin) must be unconformable or tectonic in nature.

GEOLOGY OF THE WESTERN VERMONT MINERAL BELT

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The western Vermont mineral belt consists of a series of more than nine hydrothermal ore bodies aligned in a belt extending from Ferrisburg to Searsburg. These ore bodies are associated with a string of post-tectonic (?Late Cretaceous) plutons, mostly non-emergent; three of these bodies (North Ferrisburg, Barber Hill, and Shelburne Point) do not have significant associated ore bodies, Within the mineral belt, there is a sequence of areally-ordered variations in ore content. The northern end is dominated by base-metal sulphides; the most notable of these deposits are the Brandon Cooper-Lead-Zinc and Cuttingsville Pyrrhotite deposits. The southern end is dominated by precious metals and rare earths; these deposits include the Plymouth gold deposit, the Jamaica Uranium deposit, and the Searsburg Ridge Thorium deposit.

VGS BUSINESS & NEWS

NEW MEMBERS

The following new members have been accepted by the Executive Committee:

Barry Conolly	Westford, VT
Peter Fisk	London, England
Jake McDermott	Newfane, VT
Barbara Rhoade	Windsor, VT
Elyse Rudner	Bristol, VT
Nate Stearns	Providence, RI
John White	Cornish, NH
Vermont Historical Society Library	Montpelier, VT

EXECUTIVE COMMITTEE AGENDA FOR 2/20/88

Secretary's Report
Treasurer's Report
Old Business:
- Report by By-Laws Committee
- Status of Vermont Geology vol.5
- GSA Meeting, Portland, ME., March 10-12

New Business:
- Spring Meeting of Student Papers
- Summer Field Trip
- Geological Education Committee