2016 New England Intercollegiate Geological Conference

From Maquoit Bay to Muscongus Bay
October 14-16, 2016

Just enough information from the field trip leaders to interest, excite, and entice you!

Take a look at this OUTSTANDING LINEUP of fascinating geologic field trips on THE COAST OF MAINE and Decide to Attend!

We haven't yet figured out which trips are on which days or lots of other stuff we need to know to set up registration, so YOU CAN'T REGISTER YET.

But you CAN get excited!

Last updated 4/12/2016. Subject to Change.

Even though we may not know all the details, we DO know that This promises to be a memorable conference. Here, take a look . . .
Hydrogeology and Coastal Processes at Popham Beach State Park  
*Ryan Gordon & Steve Dickson (Maine Geological Survey)*

Over the last 15 years, shoreline change and tidal inlet migration at Popham Beach State Park have destroyed and created dunes, undercut a mature pitch pine back dune forest, and threatened park infrastructure. A trifecta of king tides, storm surge, and high surf led to the formation of a new barrier island in March 2010, during the 2009-2010 East Coast sea level rise anomaly. Felled pines and beach scraping in 2011 were used to reduce tidal channel meandering and protect newly constructed bathhouses. This coastal system appears more dynamic than ever and may signal an acceleration in coastal processes that may accompany higher sea level.

Popham, Maine’s most visited state park, uses over 2 million gallons of fresh water per year, drawn from a shallow well in the sandy back-dune aquifer. A network of observation wells are currently being monitored by MGS to help model the extraction and replenishment of groundwater, and to watch for indications of salt-water intrusion into the fresh aquifer. Geophysics and computer modeling have been used to estimate the risk of salt-water intrusion as seal level rises and shorelines change.

On this trip we will see a wide variety of dynamic geomorphic features, watch coastal processes in action, measure monitoring wells, and discuss erosion, seal level rise, storm surge, and salt-water intrusion.
Meta-tuffaceous rocks of the Cushing Formation along the west side of Harpswell Neck.

**Middle Ordovician to Early Silurian terranes of the northern Casco Bay region**

David P. West, Jr. (Middlebury College) & Arthur M. Hussey II (Bowdoin College)

This trip will explore deformed and metamorphosed stratified rocks within three different lithotectonic terranes exposed in the northern Casco Bay region of Maine. Each of these terranes (the Falmouth-Brunswick sequence, Casco Bay Group, and East Harpswell Group) contains a wide variety of complexly deformed sedimentary and volcanic rocks that have been metamorphosed to amphibolite facies conditions. Aspects of the stratigraphy, structural geology, metamorphic petrology, and plutonism will be highlighted during the day. The trip will begin with large road-cut parking lot exposures in the Brunswick-Topsham area, and proceed southward to spectacular shoreline exposures along Harpswell Neck, and Sebascodegan Island, Orrs Island, and Bailey Island.
Stunning lidar image showing dozens of recessional moraines and other glacial landforms in the Waldoboro East and West Quadrangles.

**Glacial Geology and Late-glacial Sea-Level Indicators in the Waldoboro Area, Midcoast Maine: New Insights Using Lidar Imagery**

Woodrow B. Thompson (Maine Geological Survey)

The moraines and varied glaciomarine deposits of the Waldoboro region have been studied by many geologists. And they have been the subjects of numerous maps, student theses, and scholarly publications. The Friends of the Pleistocene, International Quaternary Association, Geological Society of Maine, and college classes have all visited this area. But just when we thought there were no more surprises, Lidar imagery has revealed “new” glacial landforms and former marine shorelines with unprecedented detail. This NEIGC trip will examine some of the best current exposures of Pleistocene deposits, and we will see how Lidar can be applied to mapping and understanding them.
Kinematic Indicators and Ductile Strain Domains on the Southeast Side of the Norumbega Fault Zone, Northern Casco Bay to Pemaquid Point
Mark Swanson (University of Southern Maine)

This field trip will explore a range of kinematic indicators for ductile shear strain in rocks on the southeast side of the Main Norumbega Fault Zone including symmetric and asymmetric folding and boudinage, double tailed remnant granite pods with flanking folds, R-type shear bands, R’-type antithetic kink bands and P-type tourmalinized kink bands. Shear strain indicators will be used to delineate patterns of ductile shear strain that range from simple shear dominated (both layer-parallel dextral and layer-parallel sinistral shear) to pure shear dominated (layer-normal shortening and layer-parallel elongation) domains. Emphasis will be on the stereonet representation of structural features and quantifying strain using simple calculations based on an initial orthogonal emplacement model for quartz veins and granite dike intrusions.
The migmatite-granite complex of southern Maine: its structure, petrology, geochemistry, geochronology, and relation to the Sebago pluton.

Gary Solar & Paul Tomascak

This trip is focused on the petrogenesis recorded by high-temperature rocks from Sebago Lake eastward to the coast, north of Portland, Maine, including the eastern part of the Sebago pluton and traversing into the Norumbega shear zone system. The main feature of the trip is the rocks of what we have named the southern Maine migmatite-granite complex (MGC), part of the greater migmatite-granite belt of the northern Appalachians. The rocks of the southern Maine MGC were previously mapped as part of the Sebago body as a batholith (seen on the Geological Map of Maine and the Lithotectonic Map of the Appalachian Orogen). We separate the MGC rocks based upon their structural history as supported by geochemistry and age data of migmatite components and granite bodies. The trip visits exposures of the Sebago pluton and MGC rocks that illustrate the field relations that have drawn us to the conclusion that the Sebago pluton intruded the older and sub-solidus-deformed (Norumbega?) MGC rocks.
Creating Resilient Infrastructure in the Face of Sea Level Rise

Peter Slovinsky (Maine Geological Survey); Robert Faunce (Lincoln County Regional Planning Commission); Stephanie Wyman (Milone & MacBroom); Jonathan Edgerton and Travis Pryor (Wright-Pierce).

State-level mapping of potential storm surge and sea level rise scenarios has led to a number of municipally-led infrastructure resiliency efforts in Lincoln County, Maine. We will visit sites in downtown Damariscotta, situated near the head of the Damariscotta River estuary, and Wiscasset, on the Sheepscot River, looking at vulnerability to current storm surge and future sea level rise. In Damariscotta we will focus on at-risk infrastructure at the town waterfront, discuss the process of developing viable engineering alternatives, and present the selected alternatives for flood mitigation. In Wiscasset, we will visit the Wastewater Treatment Plant (WWTP), situated directly on the Sheepscot River. This stop will showcase at-risk infrastructure, and developed adaptation strategies for a resilient WWTP. These examples of resiliency planning incorporate high-precision coastal elevation mapping, sea level modeling, engineering, and local decision-making, a comprehensive approach being followed successfully by many communities in coastal Maine.

2,000 Gallons of Oil in a School Leachfield: An Environmental Geologist’s Perspective

Keith R. Taylor (St. Germain Collins)

What happens when 2,000 gallons of heating oil is accidentally pumped into a Waldoboro middle school leachfield in the middle of a brutally cold and snowy winter? Environmental geologists to the rescue! Find out how it happened, what was done to clean it up, and how the surficial geology affected the release and cleanup.
Simultaneous Solution of a Tectonic Riddle, a Structural Puzzle, and a Stratigraphic Enigma: Bedrock Geology from Appleton to Warren

Henry N. Berry IV (Maine Geological Survey); David P. West, Jr. & William B. Burke (Middlebury College)

The Sennebec Pond fault nearly separates Silurian turbidites of the Fredericton trough from Precambrian(?) to Ordovician rocks to the east. The tectonic riddle here (Osberg, 1974 NEIGC) is whether the Silurian basin and the pre-Silurian rocks are different parts of a single terrane or might be exotic terranes that have since been accreted tectonically along a significant suture. The Sennebec Pond fault itself presents a complex structural puzzle, having dismembered and rearranged an older, structurally complicated polymetamorphic tectonostratigraphy. Within this puzzle at the margin of the riddle is a stratigraphic enigma, in which a wide variety of distinctive rock types (quartzite, marble, conglomerate, various schists, volcanics, etc.), including mafic volcanics related to ocean-ocean subduction, may represent fragments of a stratigraphic section spanning 100 million years that is nowhere completely preserved. This trip will look at rocks on both sides of the Sennebec Pond fault from Appleton to Warren, and discuss how detailed mapping, stratigraphy, geochemistry, geochronology, igneous and metamorphic petrology, and structural geology help to address this enigmatic puzzling riddle.

Flattened scoria bombs in ca. 500-million-year-old metamorphosed arc-volcanic rocks east of the Sennebec Pond fault.
Plutonic rocks from Waldoboro to Richmond
Amber Whittaker, Henry N. Berry IV (Maine Geological Survey),
David P. West, Jr., & Cailey B. Condit (Middlebury College)

Maine has long been known for its granite, from both scientific and historical perspectives. This trip comprises a survey of the different plutonic rocks along the Maine coast between Waldoboro and Richmond. The morning will focus on the several granitoids of the Waldoboro Pluton Complex around Muscongus Bay, which were host to an active quarry industry in the early 1900s (see Austin and Hussey, 1958). From there, we will visit a series of other notable plutonic rocks, highlighting the variety of composition, lithology, age, structure and significance of plutons in this relatively small area of Maine. The trip will be geared toward an undergraduate igneous petrology level and will emphasize topics such as pluton classification, mineral identification, textural description, and emplacement styles and settings.
Geomorphology of the Sheepscot River:
Deglaciation, salmon habitat and historic dams
Noah P. Snyder (Boston College)

This trip will provide a downstream tour of the Sheepscot River, highlighting field sites of several recent research projects. The Sheepscot River hosts one of the southernmost runs of anadromous Atlantic salmon in the U.S. and this has motivated interest in the relationship between fluvial geomorphology, aquatic habitat, and land-use change in the watershed. The trip will focus on the role of mainstem lakes as sediment traps and eroding glacial deposits as sediment sources in setting the morphologic and habitat characteristics of the river. We will also explore the role of historic dams in influencing the valley-bottom morphology, and compare this with the response of the river network to deglaciation.
Stratigraphy, structure, and plutonism in the Wiscasset-Dresden region of mid-coast Maine
David P. West, Jr. & Cailey B. Condit (Middlebury College)

This trip will explore strongly deformed and metamorphosed stratified rocks of the Casco Bay Group, Fredericton Belt, and Dyer Long Pond migmatite complex near Wiscasset. Additionally, the petrology, geochemistry, and variety of overprinting structures within plutonic rocks of the Late Silurian-Early Devonian Blinn Hill complex and Edgecomb gneiss will be investigated. Finally, structures associated with the regionally extensive Norumbega fault system will be examined. All of this information will be integrated into a complex story of Acadian terrane accretion and orogenesis, and subsequent high-angle faulting.
Bluff Erosion and Coastal Landslides in the
Glacial-Marine Presumpscot Formation, Casco Bay.

Joe Kelley, Dan Belknap, Nick Whiteman (University of Maine)
Stephen Dickson (Maine Geological Survey)

Raised glacial-marine muddy sediment forms bluffs up to 15 m in height along the shoreline of Casco Bay. Although "slow" bluff erosion occurs almost daily, episodically, the bluffs experience large landslides. We are attempting to model bluff erosion in the bay in an effort to assess the impact of development and future rise in sea level. For the trip we plan to visit a number of exposures of the Presumpscot Formation that exhibit variations in the glacigenic sediment and in landslide hazards related to stratigraphy, sediment texture, bluff height, aspect azimuth, fetch, and other factors.
Boudinaged andalusite-sillimanite vein in the Phippsburg Shear Zone at Hermit Island.

Bedrock Geology of Small Point, Maine: A Fresh Look at the Stratigraphy, Structure, and Metamorphism

Dykstra Eusden$^1$, Heather Dolittle$^1$, Tim Grover$^2$, Jen Lindelof$^1$, Peter Miller$^1$, and Haley Sive$^1$ ($^1$ Bates College; $^2$ Castleton University)

The Ordovician Scarboro, Spring Point, and Cape Elizabeth Formations of the Casco Bay Group are exceptionally well exposed on coastline outcrops of Small Point in Phippsburg. Join us for a (mostly walking) tour through the newly revised stratigraphy, the Acadian through Alleghanian tectonic features highlighted by the Cape Small Synform and Phippsburg Shear Zone, and spectacular porphyroblasts that record multiple Paleozoic metamorphic events.

http://w3.salemstate.edu/~lhanson/NEIGC/Conference.html