Coastal Erosion & Climate Change: PRIDE 2005 – Towards an Alaska Wind/Wave Climatology

2nd PRIDE Workshop – August 9-10, 2005

David Atkinson, Int’l Arctic Research Center, Univ. Of Alaska-Fairbanks
James Partain, NOAA NWS Alaska Region Headquarters
Outline

• Project Purpose
• Problems To Be Addressed & Intended Benefits
• Project Relevance: PRIDE, NOAA
• Project Description, Methodology & Status
• Challenges & Opportunities
Project Purpose

• PRIDE 2005 Proposal – **Towards an Alaska Wind/Wave Climatology**
  – A collaboration between NOAA NWS Alaska Region
  – UAF’s International Arctic Research Center (IARC)
  – via the NOAA Cooperative Institute for Arctic Research (CIFAR)

• Provide an applied operational capability to assess the risk of future coastal inundation and erosion events and their associated impacts
  – Address ocean wind and wave hindcasts combined with changes in storminess, sea level, sea ice and permafrost, and related societal impacts
  – Explore risk management decision support capabilities, including related data-management tools and visualization techniques
The Problem Being Addressed

• In a nutshell:
  – climate change uncertainties,
  – coastal erosion certainties,
  – risk-management and decision-support needs, and
  – policy research and development

• Coastal erosion in Alaska:
  – Embodies all these needs
  – Research, development & implementations in Alaska will address these needs and benefit other coastal-erosion threatened areas of the Pacific (more on this aspect tomorrow)
Project Relevance

• This proposal addresses all 3 PRIDE themes: *Climate and Coastal Communities* primarily, and *Marine and Coastal Ecosystems* and *Risk Management* secondarily

• Development of Integrated Data Products, and associated tools for data visualization and delivery are fundamental to the objectives of this proposal

• Development of the proposed climatology, data, and supporting tools are not only extremely relevant to PRIDE and its developing infrastructure, but also to NOAA’s strategic goals and tactical missions
Alaskan Coastal Climatologies

- **Objective:** Provide historical information and future scenarios regarding wave and storm surge run-up along Alaskan coastlines.

- **Initial Focus:** Develop climatologies addressing near shore retreat of sea ice, permafrost loss, and sea level rise and related impacts on coastal erosion due to increased coastal wave and storm surge action.
Project Description:
Alaskan Coastal Climatologies

Why Climatologies?
• Changes in Sea Level and Extent of Seasonal Sea Ice
• Coastal Erosion and Flooding
• Impacts on environment, economic activities, and human activities
• Plan for and proactively mitigate (when possible) impact on socio-economic activities.

Initial Issue and Focus: Scientific Integration
• Short term forecasts to long term trends and potential impacts
• Requires use of multiple models and analyses
• Requires a variety of spatial and temporal observations
• Requires detailed information about the natural and human environments
Alaskan Coastal Climatologies

Proposed Plan of Action - FY 06-08

- Test results of the hind cast modeling for potential use in near shore wind/wave modeling and forecasting.
- Design/conduct demonstration project for selected study region(s).
- Deliver prototype data and user tailored applications/information.
- Identify other decision support products and services.
- Complete development and produce AK coastal wind/wave climatologies & maps to include sea level, near shore sea ice, and permafrost conditions.
- Provide user web-based access to AK climatologies and associated maps.

FY 09 and Beyond

- Expand routine operational processes for use in future AK Coastal Climatologies.
- Monitor current conditions and improve predictions and projections for use by policy makers and developing mitigation plans.
# Project Status

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wave model compilation</td>
<td>Gather information about deep ocean and near shore wave models suitable for use by this project that are available in the US or easily available abroad</td>
<td>Completed August 2005</td>
</tr>
<tr>
<td>Literature search</td>
<td>Gather references and documents concerning relevant work that bears on this project</td>
<td>Underway August 2005; references being compiled</td>
</tr>
<tr>
<td>Data ingestion</td>
<td>Gather data necessary to discharge some of the science components required to complete this project. Begin with the NCEP North American Regional Reanalysis</td>
<td>Underway August 2005 First NARR wind fields obtained; first handling programs written</td>
</tr>
<tr>
<td>Conduct scoping workshop</td>
<td>Run a workshop to scope out the project. Focus at this point is on Alaska: workshop held therefore in Anchorage. State and stakeholder representation was obtained. Group formed an on-going resource for science plan development and theme work.</td>
<td>Completed August 2005 Final report in the form of a science plan (currently in preparation)</td>
</tr>
</tbody>
</table>
Challenges & Opportunities

• Challenges:
  – *Keeping the project focused*;
  – *Expanding the scope of the project :-(*)
  – *Issues represent a union of disciplines that may not have previously been considered together: atmosphere, ocean, geology, cryosphere*

• Opportunities:
  – *Many existing databases, models, and studies that will bear on the problem*;
  – *Existing and new partnerships will be used – many at the state, federal, and NGO levels are setting requirements, making plans, and acquiring resources (e.g. IOOS/Regional Ocean Observing Systems – Alaska Ocean Observing System)*
Mahalo nui loa!