Canadian Foundation for Climate and Atmospheric Sciences (CFCAS)
Fondation canadienne pour les sciences du climat et de l'atmosphère (FCSCA)

Prototyping fine-resolution operational wave forecasts for the Northwest Atlantic

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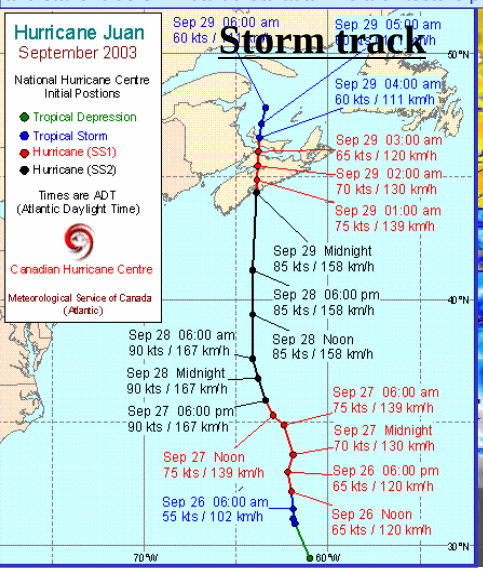
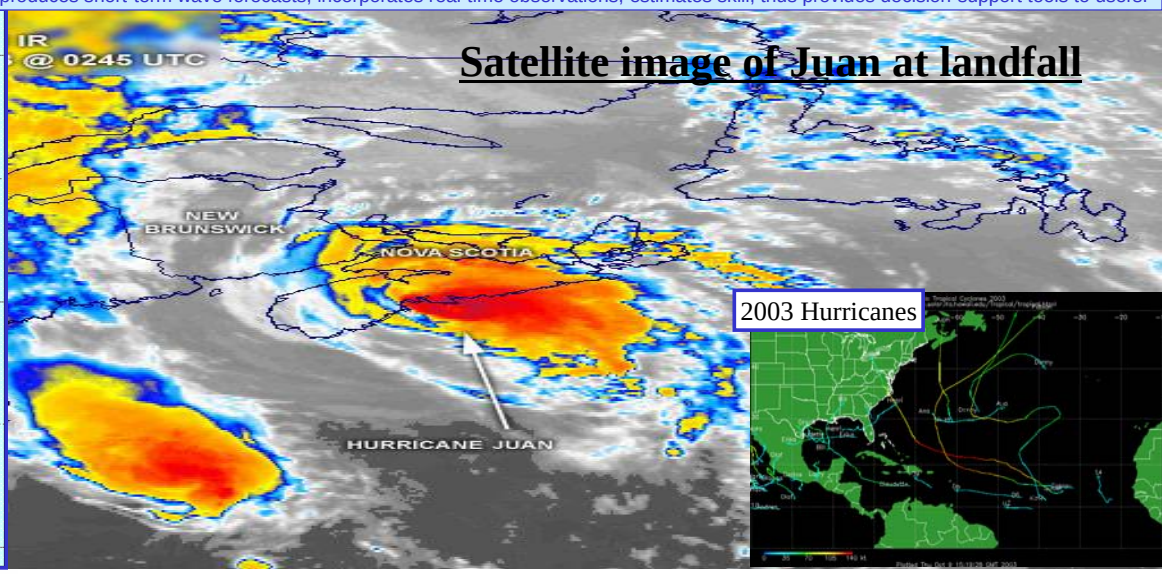
Introduction: In September 2003, Hurricane Juan made landfall in Nova Scotia and cut a swath of destruction across the province in what was the strongest marine storm in the last century. Accurate and timely predictions of the environmental response to extreme weather can mitigate the cost of disaster recovery and obviate the cost of unnecessary preparation - ultimately saving lives, property, and mitigating impacts. Through CFCAS and GoMOOS funding, we implemented a prototypical forecast system for ocean waves that is available to assist forecasters and stakeholders in Atlantic Canada. The architecture produces short-term wave forecasts, incorporates real-time observations, estimates skill, thus provides decision-support tools to users.

Storm track

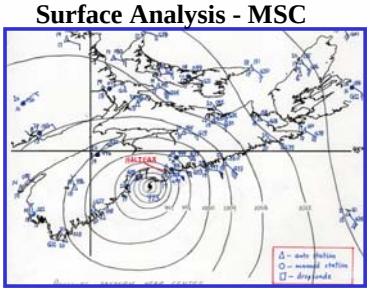


Satellite image of Juan at landfall



0300 UTC 29Sep.03

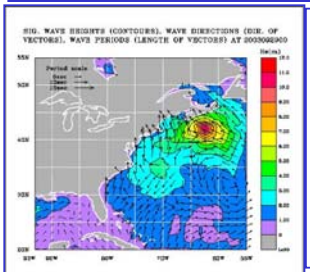
Surface Analysis - MSC



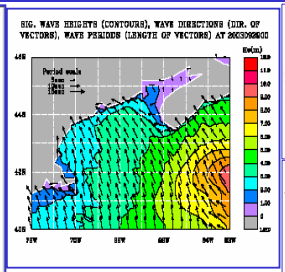
Landfall

Wave Forecasts

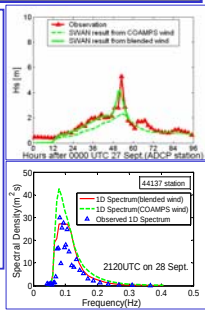
Juan: 24h/48h forecast issued 28 Sept. 2003, 00UTC



Maximum Significant Wave Height = 11.1 m

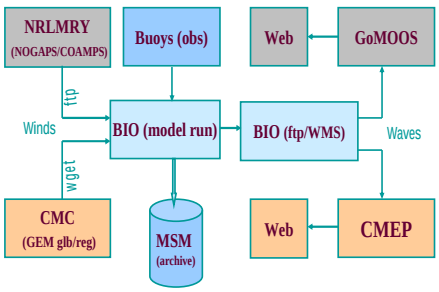


Maximum Significant Wave Height = 9.9 m

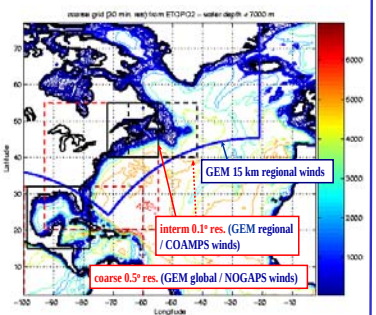


Mitigating Coastal Environmental Impacts

Real Time Data & Products Flow

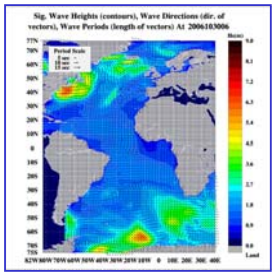


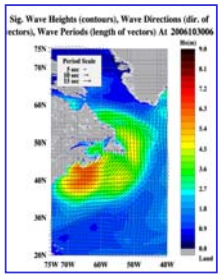
Model Grids

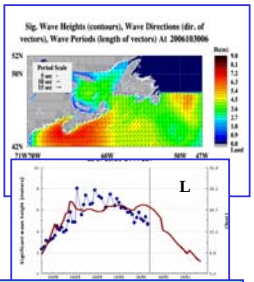


Uses CMC (Canadian Meteorological Centre) and FNMOC winds to drive waves. The following examples of wave products are available on websites: cmep-av.ocean.dal.ca, www.OpenIOOS.org and www.GoMOOS.org – Gulf of Maine Ocean Observing System.

Daily 24/7: 30h/48h forecast issued 29 Oct. 2006, 00UTC







Coarse, medium and fine resolution grids

Real-time data – model comparison

Conclusions:

Extreme storm forecasting requires substantial innovation in terms of understanding the storms development. Model-data (observation) comparisons will improve predictions of winds and waves. Better forecasts will allow better preparation for storms that cause damage and will reduce the impact on areas that are ultimately affected.