OCEAN NETWORKS CANADA

T5. LET'S NOT MAKE TSUNAMI BC'S BLIND SPOT

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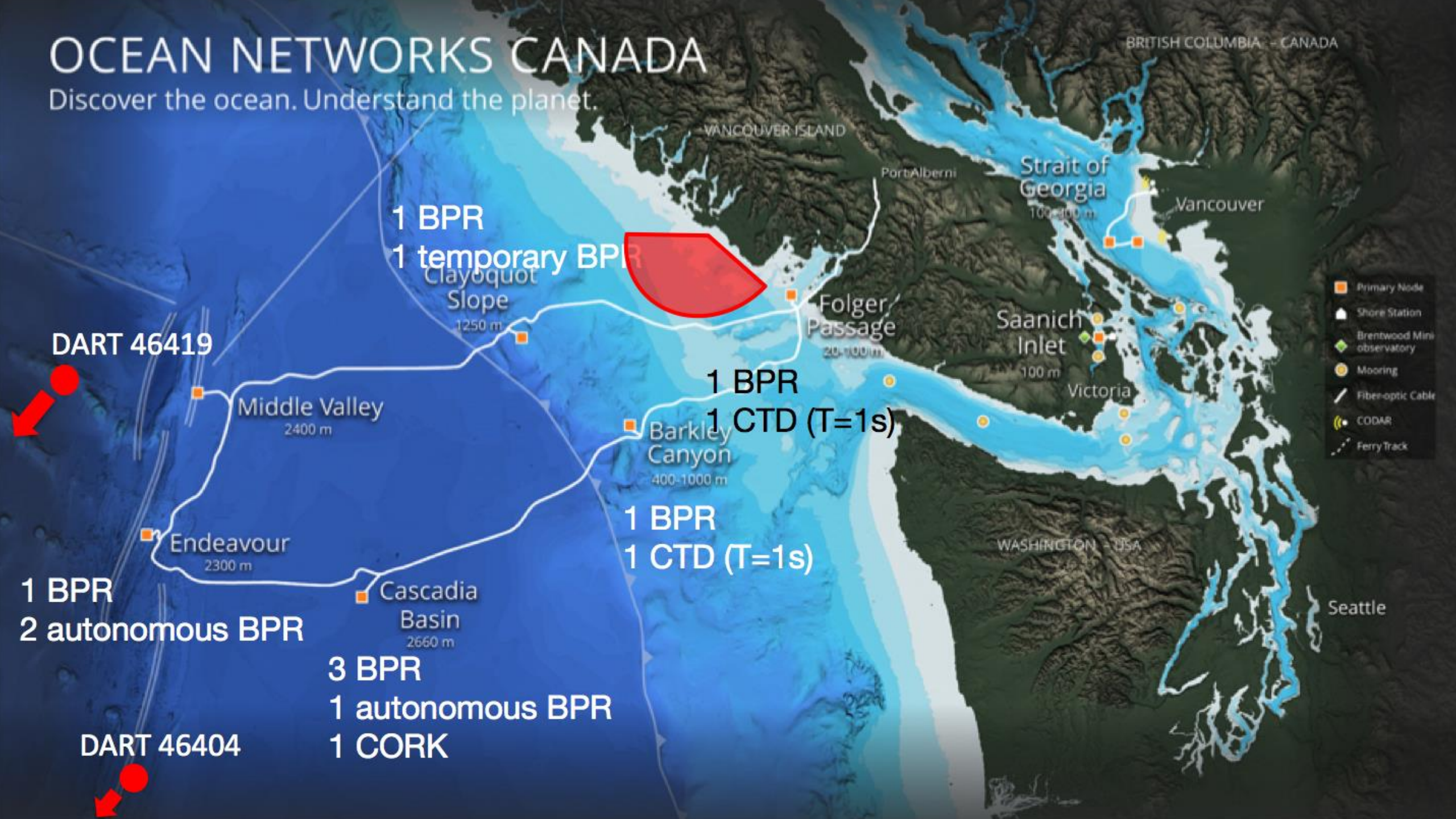
OCEAN NETWORKS CANADA
CANADIAN INFRASTRUCTURE & PARTNERS
Arctic Drifter Buoys
Pond Inlet
Qikiqtarjuaq
Steensby Port
Canadian Ranger Ocean Watch Program
Cambridge Bay
Hudson Strait
Hudson Bay
Lake Melville
Prince Rupert
Kitamaat Village
Churchill
Campbell River
Tofino
Salish Sea Marine Survival Program
NEPTUNE
University of Victoria
VENUS
University of Saskatchewan
Mill Bay
FORCE
Great Lakes
PACIFIC OCEAN
ATLANTIC OCEAN
Existing Installation
Funded Installation
Proposed Installation
Mobile Asset
Industry Partner
Partner University
Data Centre
Data Transfer Line
Fibre-optic Cable
Bathymetry (50 m contour lines)
-3500 m
AN INITIATIVE OF University of Victoria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Discover the ocean. Understand the planet.
BRITISH COLUMBIA - CANADA
VANCOUVER ISLAND
Port Alberni
Strait of Georgia
100-400 m
Vancouver
1 BPR
1 temporary BPR
Clayoquot Slope
1250 m
Folger Passage
20-100 m
Saanich Inlet
100 m
Victoria
DART 46419
Middle Valley
2400 m
1 BPR
1 CTD (T=1s)
Barkley Canyon
400-1000 m
1 BPR
1 CTD (T=1s)
Endeavour
2300 m
WASHINGTON - USA
Seattle
1 BPR
2 autonomous BPR
Cascadia Basin
2660 m
3 BPR
1 autonomous BPR
1 CORK
DART 46404
Primary Node
Shore Station
Brentwood Mini observatory
Mooring
Fiber-optic Cable
CODAR
Ferry Track

WHAT DO WE HAVE?

WHAT DO WE NEED?

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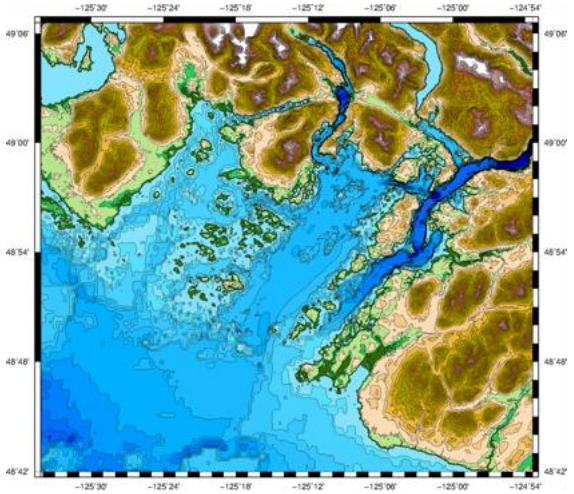
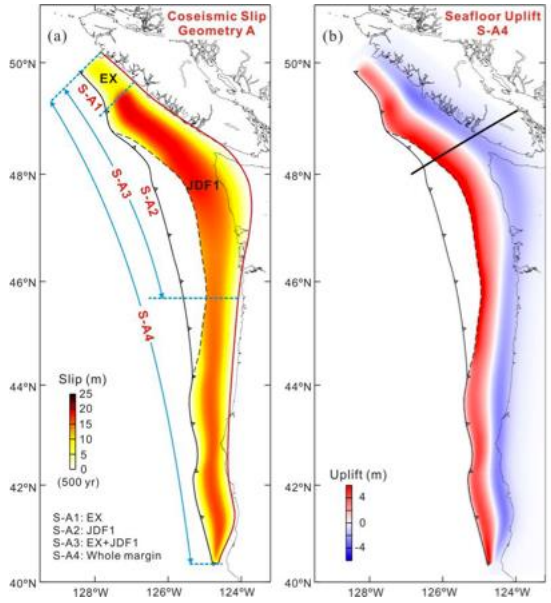


TSUNAMI

WAVE MODELS



Wave model

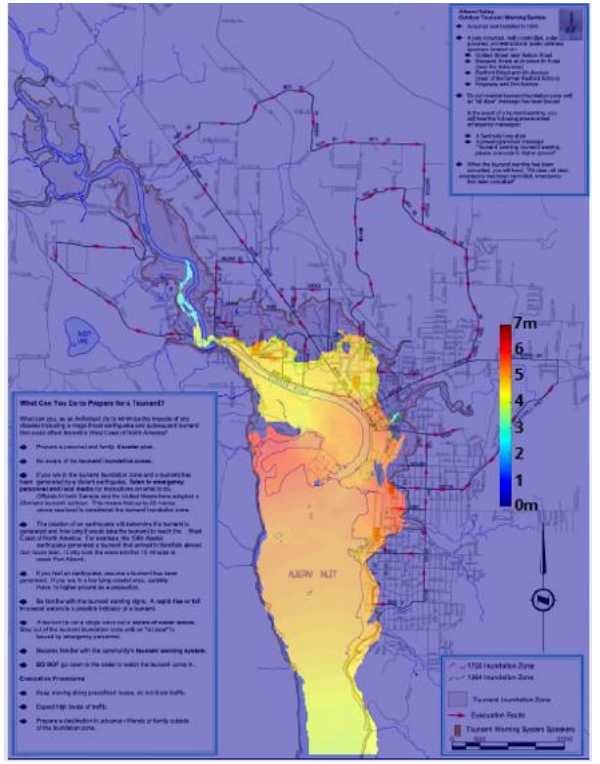
Wave height

Inundation maps

Maximum currents

Time of arrival

Duration of events



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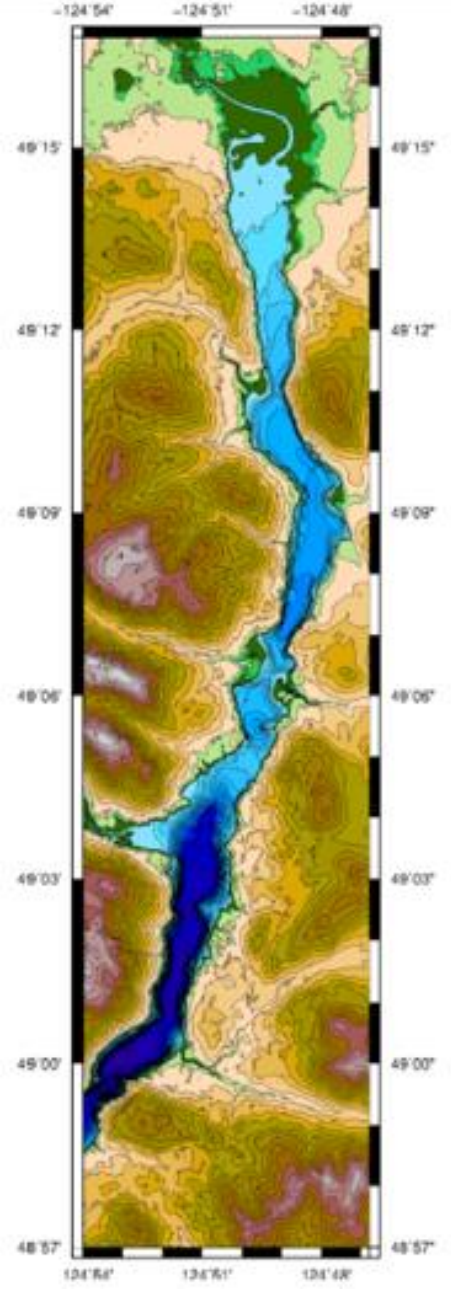
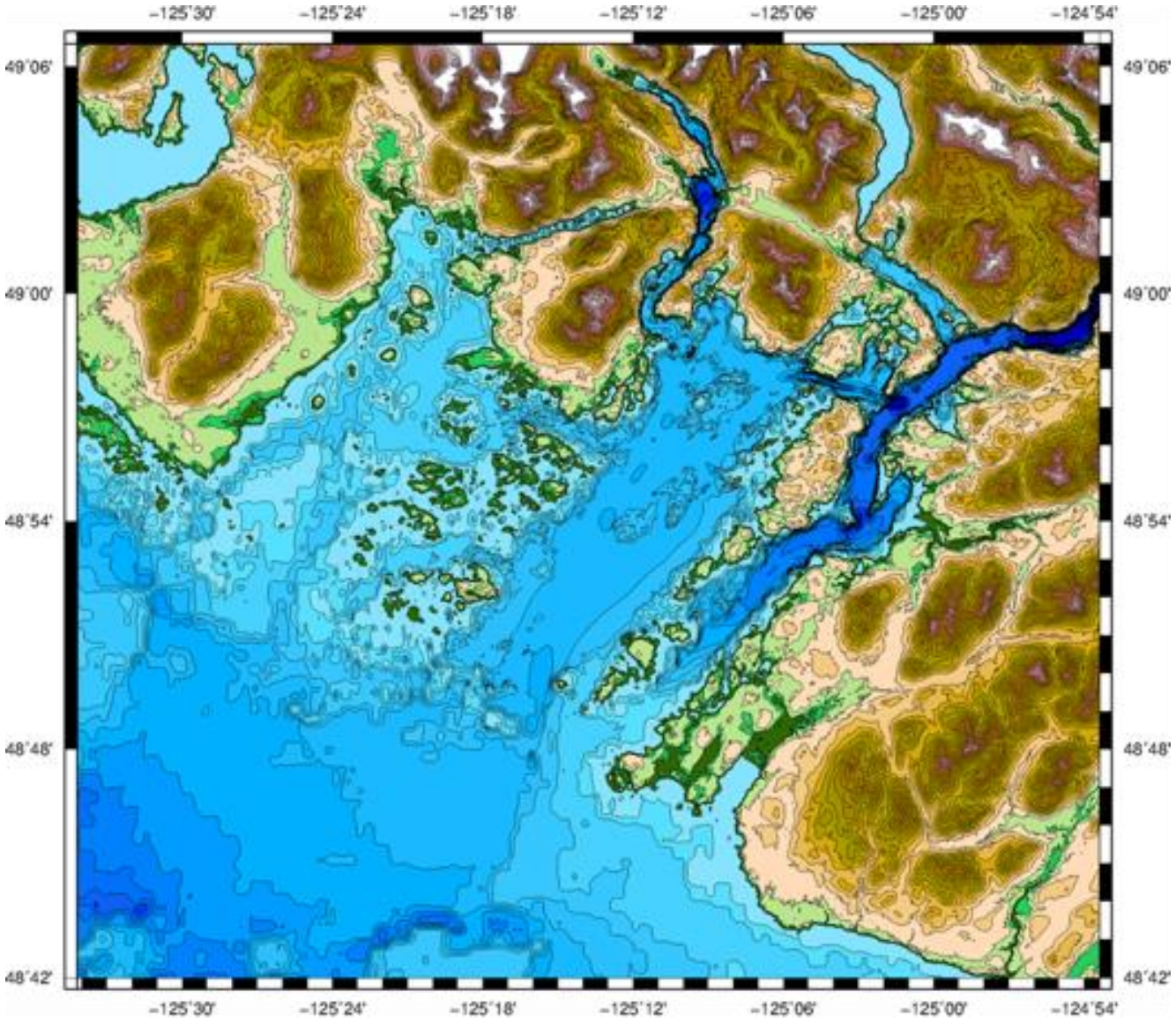
DIGITAL ELEVATION MODELS (DEM)





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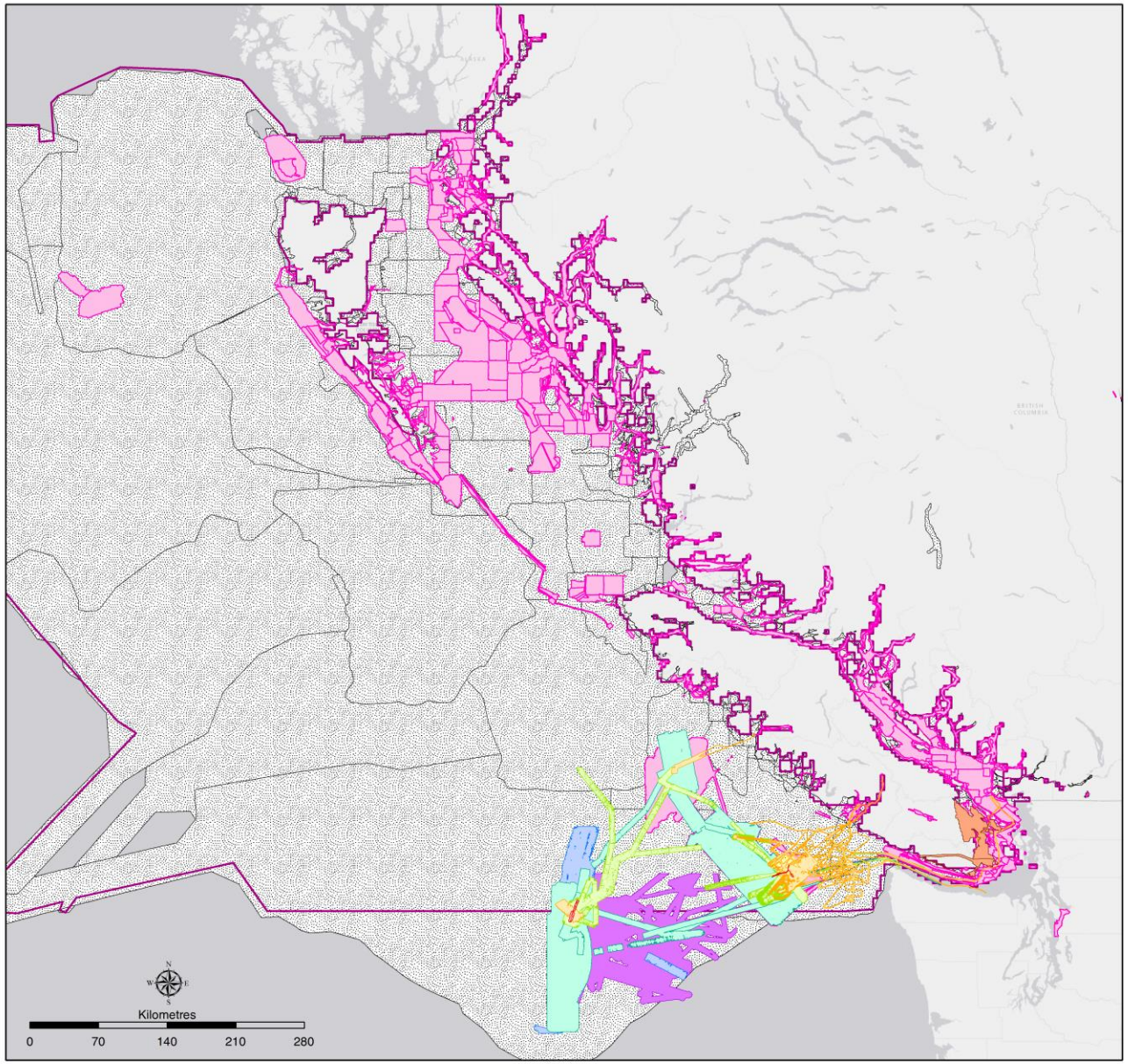
Bathymetry Coverage - West Coast British Columbia



Description: This map shows the footprint of the bathymetry datasets currently held by Ocean Networks Canada and/or the Canadian Hydrographic Service (CHS). Many of these data sets are externally owned and have constraints. Please see attached spreadsheet for more information.

Coord System: WGS 1984 Mercator
Basemap Credit: Service Layer Credits: Copyright: ©2013 Esri, DeLorme, NAVTEQ
Date Created: 2017-06-26
Map Contact: kdouglas@uvic.ca

Existing datasets

- UW_Imagenex_Mothra_01
- MBARI_AUV_Endeavour_1
- MBARI_AUV_Barkley_1to10
- GEOSCAN_LIDAR_SVanIsle_2
- GEOSCAN_LIDAR_SVanIsleGulfIslands_2
- ONC_FK009_EM710_Folger_3
- CHS_EM1002_PAinlet_5
- UW_TN183run2nootka_EM300_Nootka_5
- ONC_FK009_EM710_WestCoast_5
- ONC_RoyalCity_RS8111_NorthCableRte_5
- ONC_RoyalCity_RS8111_PAinlet_5
- ONC_RoyalCity_RS8111_SouthCableRte_5
- ONC_TN282_EM302_Endeavour_5
- UW_TN183lastsurvey_EM300_WestCoast_5
- ONC_TN282_EM302_BarkleyCanyon_10
- ONC_FK009_EM302_WestCoast_20
- UW_TN183merged_EM300_WestCoast_20
- ONC_TN298_EM302_Endeavour_30
- UW_TN146_EM300_WestCoast_50
- UW_TN159_EM300_Endeavour_50
- UW_TN175_EM300_CascadiaMargin_50
- UW_TN183_EM300_EndeavourCascadiaBasin_50
- UW_AT353_Seabeam2000_Endeavour_75
- UBremen_CascadiaBasin_100
- CHS_Multibeam_Variable_052017
- CHS_BCCoastGrid_500
- All_CHS_NonMultibeam_052017

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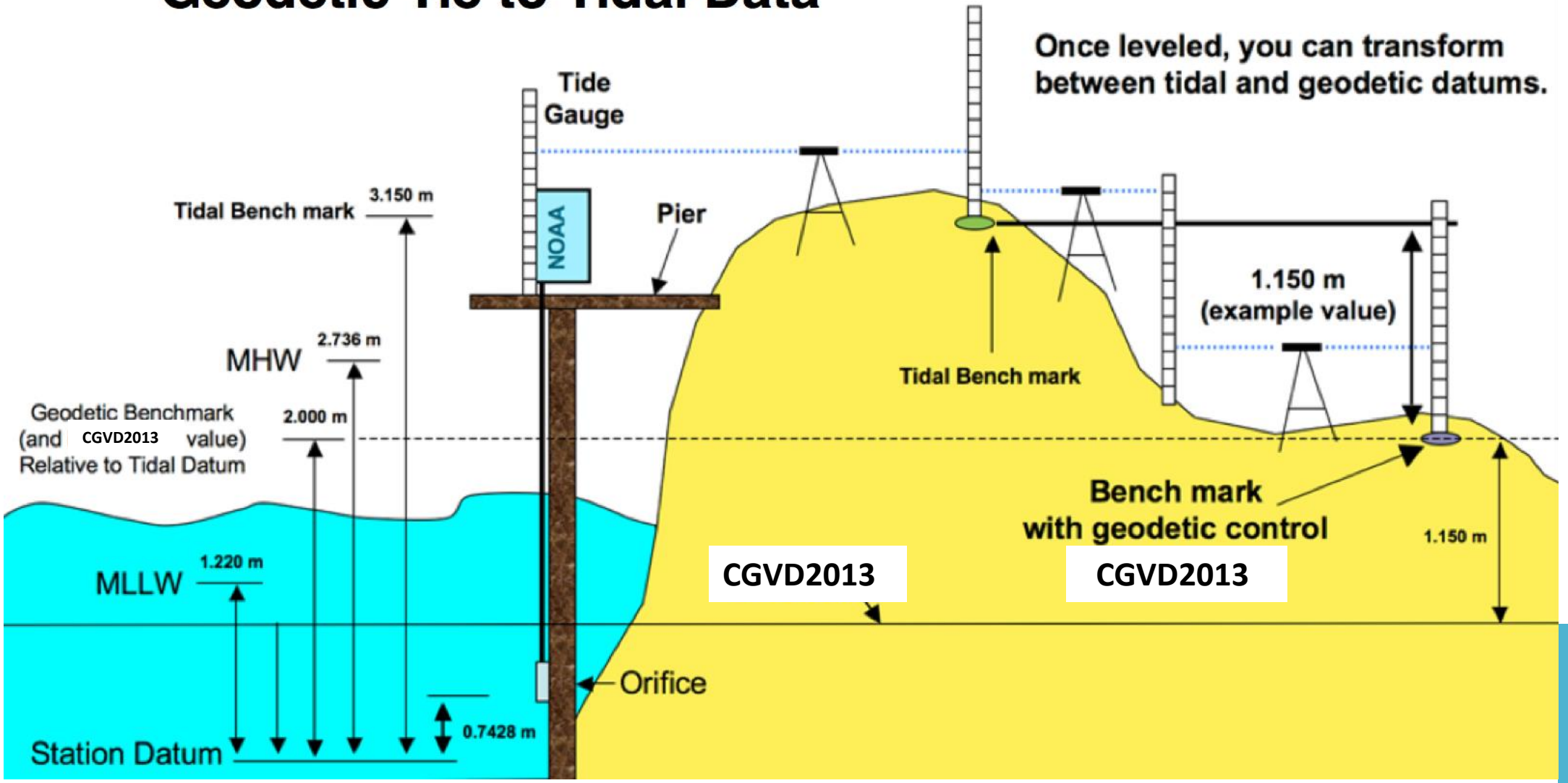
Geodetic Tie to Tidal Data



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We need:

1. **More current standardized data**: bathymetry and topography
2. Better **data exchange**
3. Keep improving **tidal data correction**

We have:

1. Data for quite a few areas at **fine resolution**
2. Data for most of BC at **coarse resolution**

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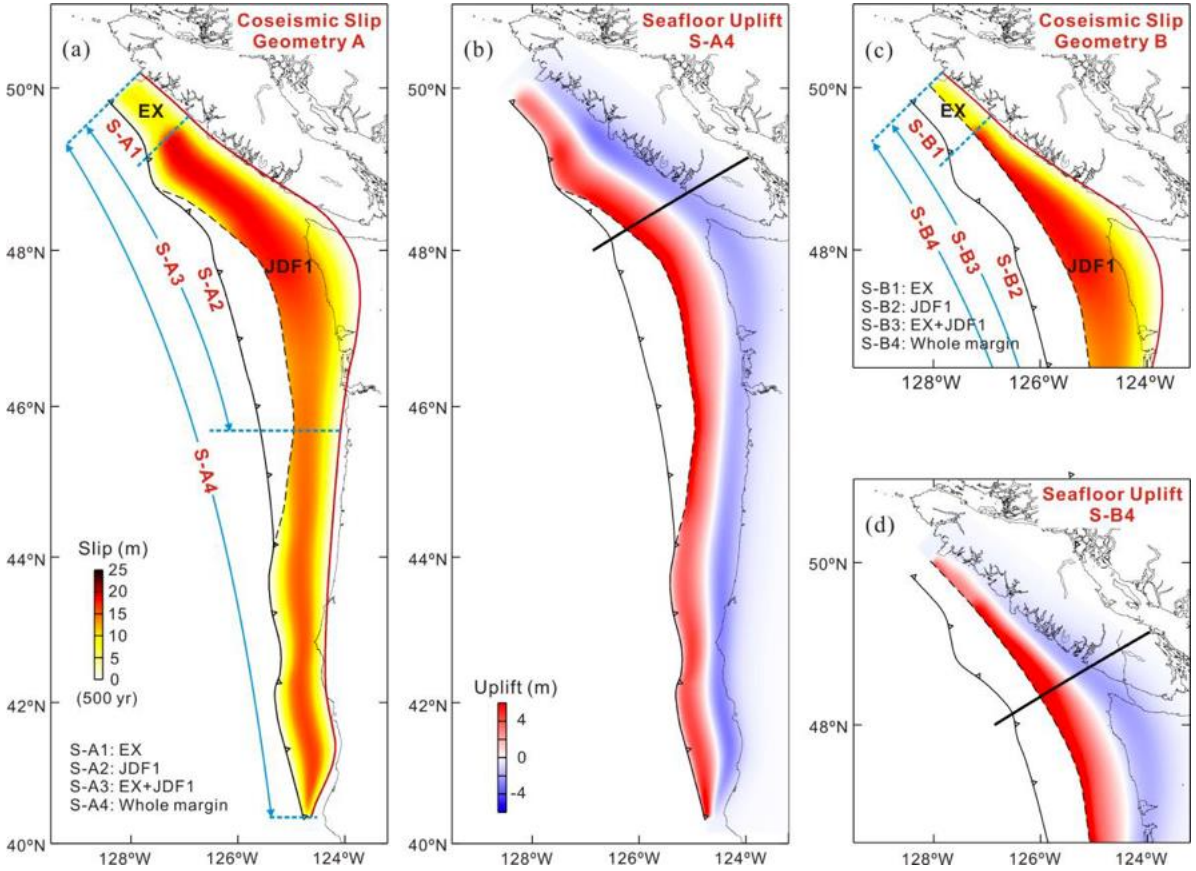
SOURCE MODELS

Gao et al. (submitted)



NEW MODELS FOR CASCADIA!

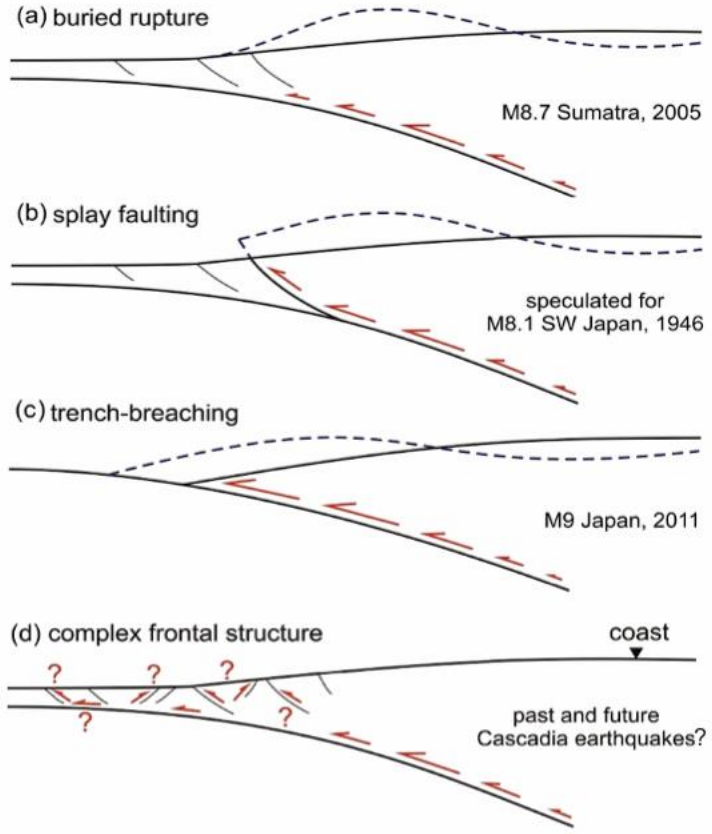


Fig. 1.1. Tsunami-genic rupture scenarios of subduction earthquakes [*Wang and Tréhu*, 2016].

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We need:

1. More data for **probabilistic analysis**
2. A **source library** – collaborate with US?

We have:

1. **New models** that consider more and worst cases than before

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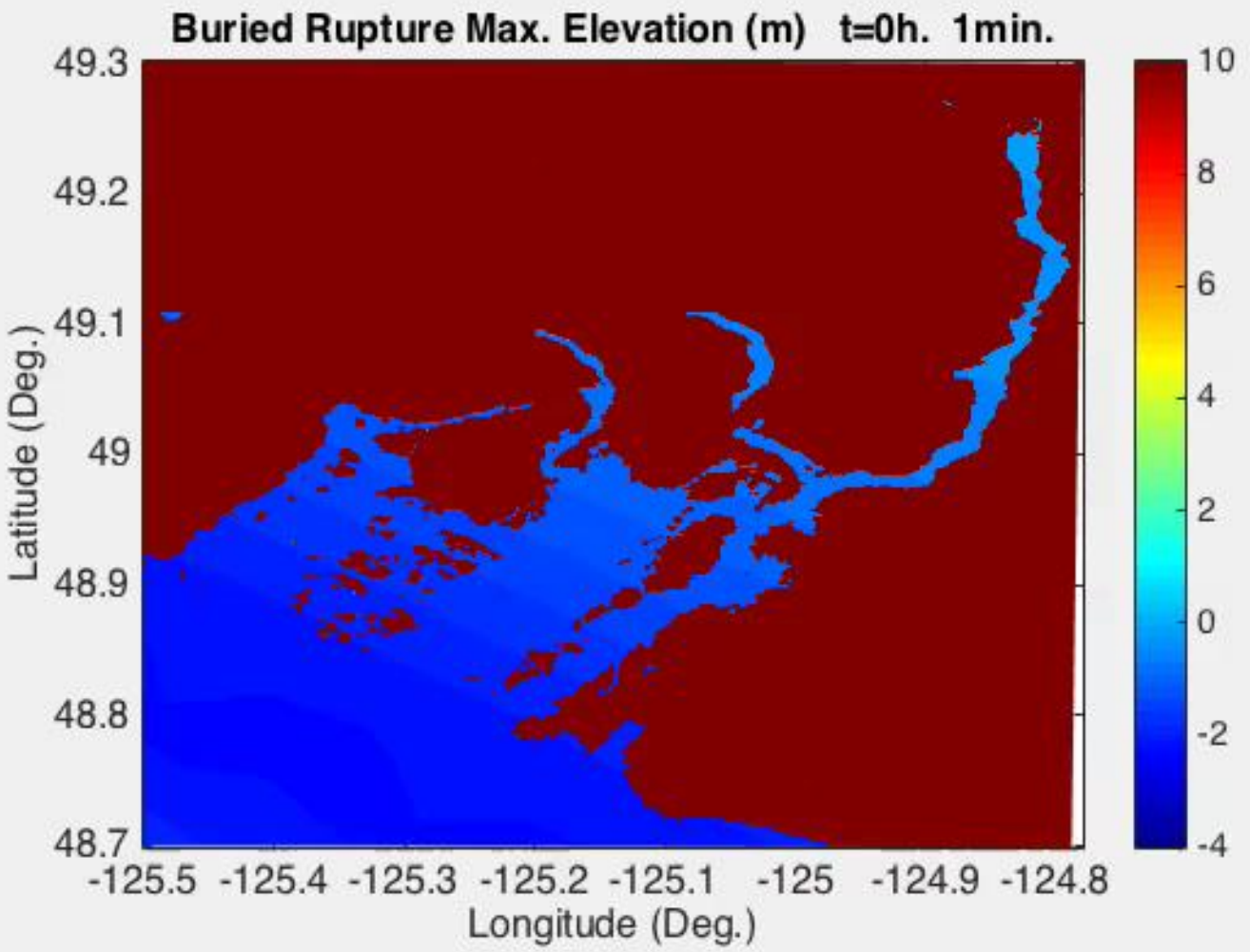
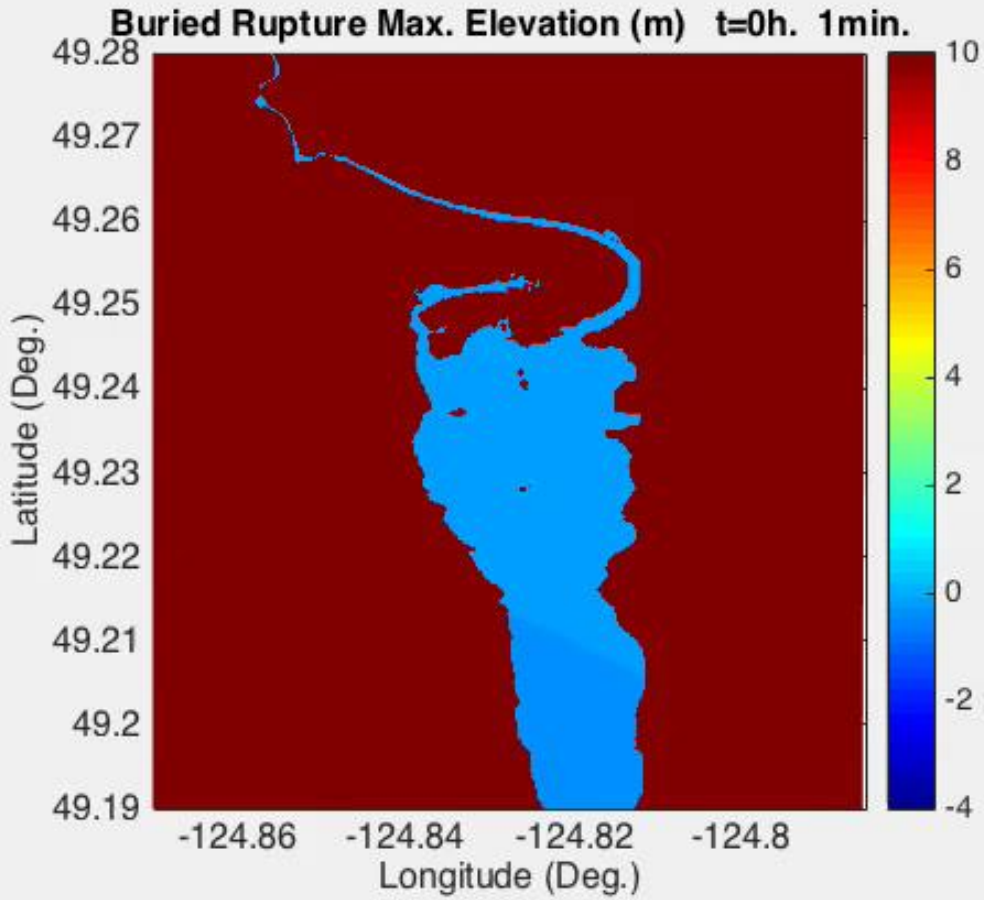
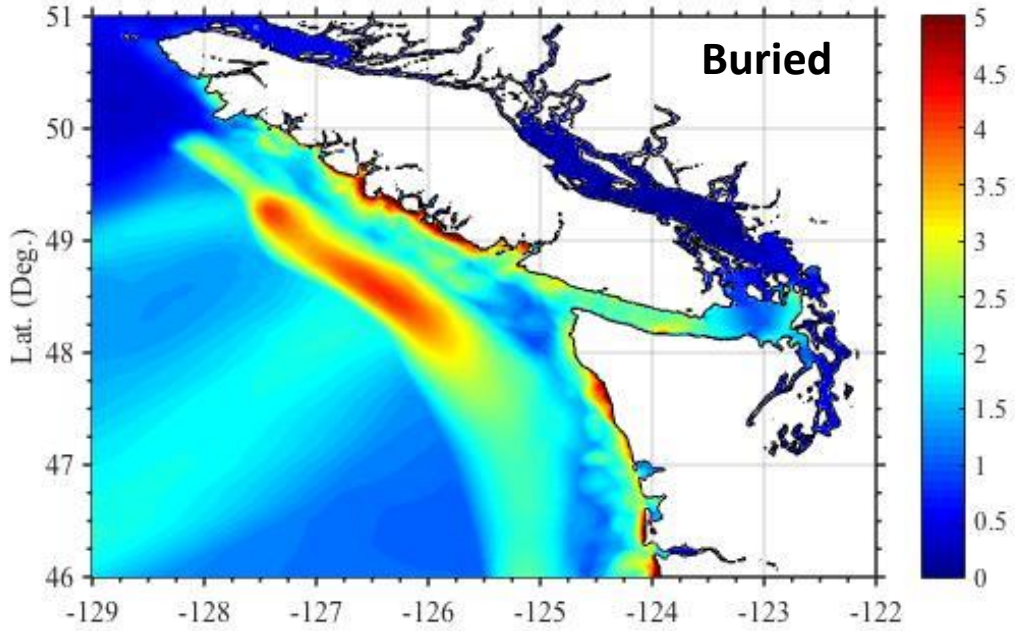
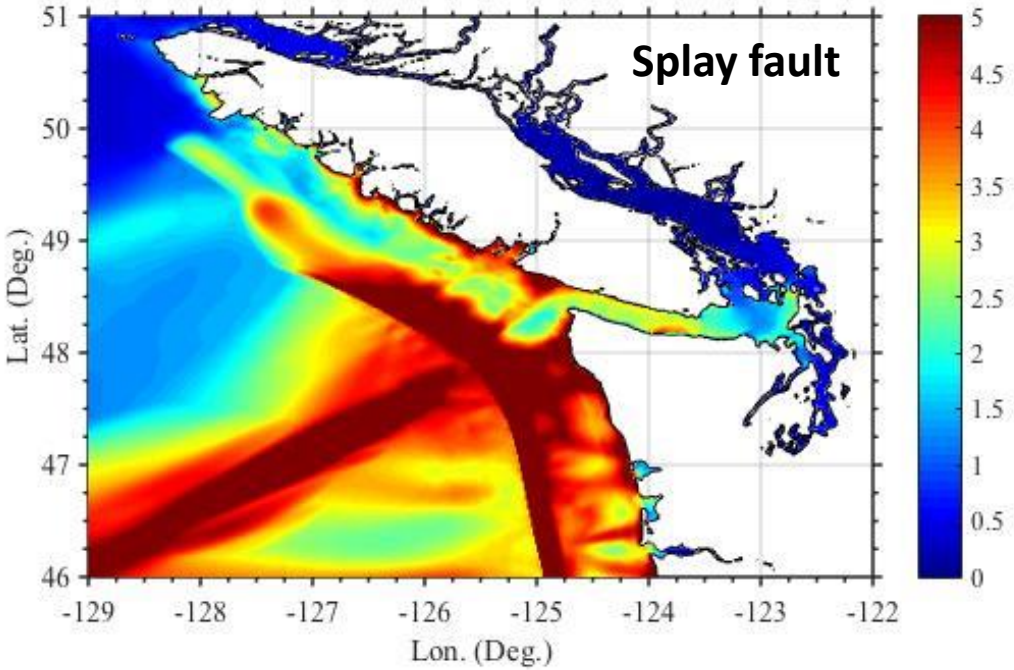
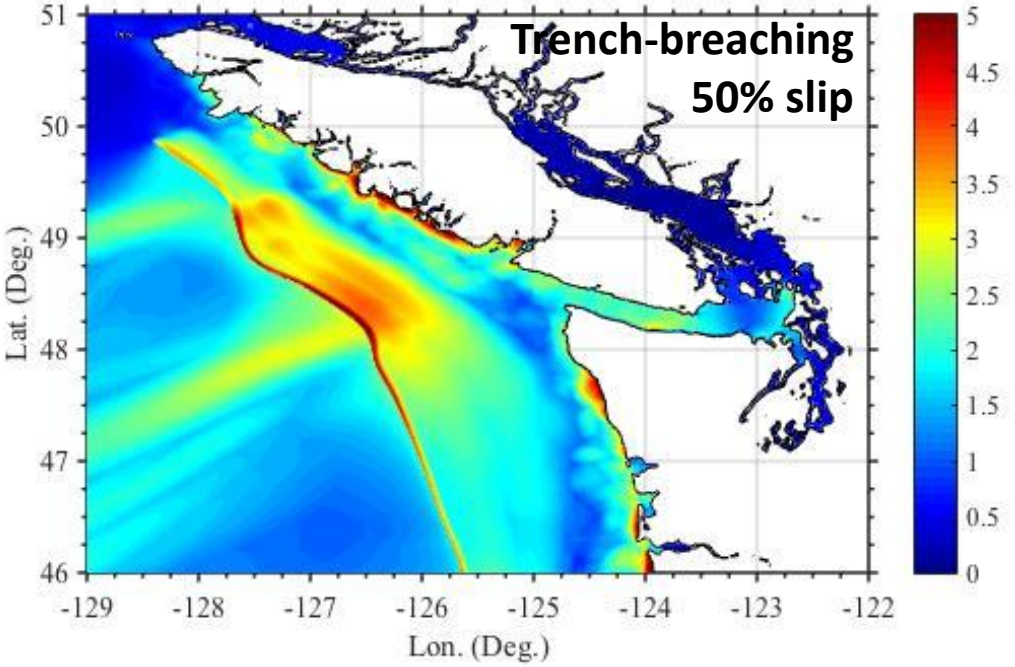
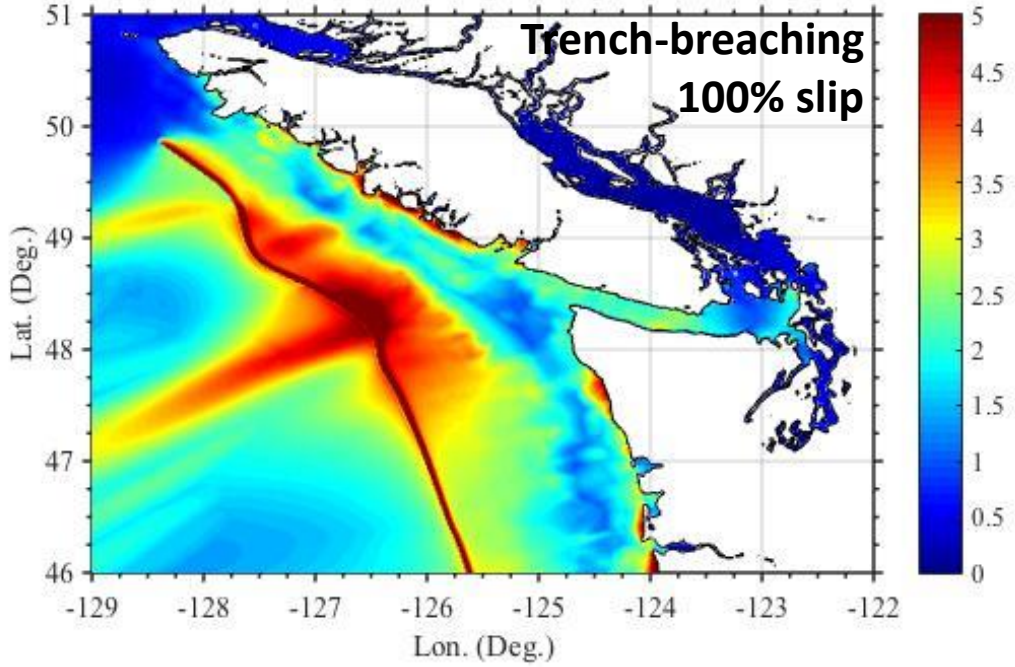

Buried Rupture Max. Elevation (m) t=0h. 1min.
49.3
49.2
49.1
49
48.9
48.8
48.7
Latitude (Deg.)
-125.5 -125.4 -125.3 -125.2 -125.1 -125 -124.9 -124.8
Longitude (Deg.)
10
8
6
4
2
0
-2
-4


Buried Rupture Max. Elevation (m) t=0h. 1min.
49.28
49.27
49.26
49.25
49.24
49.23
49.22
49.21
49.2
49.19
Latitude (Deg.)
-124.86 -124.84 -124.82 -124.8
Longitude (Deg.)
10
8
6
4
2
0
-2
-4









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Middle School

We need:

1. **Standardized** approach
2. **Benchmarking** efforts – all hands on deck
3. Easy to understand formats – **new visuals**
4. **Mind the gap** – Compliance US alerts

We have:

1. **Models** available that have been benchmarked
2. **Results** for many areas
3. **Basin frequencies** analysis

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WHAT CAN WE DO WITH WHAT WE HAVE?

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1. Identify **resonant basins** and calculate their frequency
2. Identify **priority areas** for data collection
3. **Educate** users/public
4. **Identify weaknesses and quantify them** – engineering approach

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1. How can we translate what we have into **risk**?
2. How can we integrate what we have in the **civil code**?
3. For areas that **need data, what's the strategy**?
4. For areas with **enough data**, what's the **next step**?
5. How can we **make this work** for industry, academia, First Nations, non-for-profits and government? Guidelines?

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THANK YOU!

Ocean Networks Canada is funded by the Canada Foundation for Innovation, Government of Canada, University of Victoria, Government of British Columbia, CANARIE, and IBM Canada.

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