Since Europeans first settled B.C., we have known that earthquakes occur here ...

... but we did not know that giant earthquakes happen just off our coast until 30 years ago
Tidal wetland record

Niawiakum River, WA

1. Coastal forest
2. Great earthquake; land sinks, flooding forest
3. Within an hour tsunami rushes ashore
4. Dead forest in a tidal flat
5. "Ghost" forest

before the earthquake
during the earthquake tsunami after the earthquake years later
Recurrence – tidal marshes

Final environment of soil N as inferred from:
- Diatom assemblage
- Lack of tree roots

Soil N weathered in profile of soil S

Soil W destroyed and soil U weathered in profile of soil Y

Upland
- J
- L
- N

Tidal marsh
- J
- L
- N
- S
- W
- U
- Y

Tidal flat
- J
- L
- N
- S
- W
- U
- Y

Age range for inferred earthquake
- J
- L
- N
- S
- W
- U
- Y

Age, in calendric years before AD 2000

Vertical scale for stratigraphic columns; approximate vertical scale for inferred changes in relative land level

1m
- Bold soil
- Mud
- Faint soil

N Letter name of soil

Sitka spruce: size of symbol shows relative size and abundance

Campsite: marked by rock, charcoal, and bone in soil Y
Tsunami research

Tofino, BC
Recurrence – coastal lakes

Kelsey et al., 2005
Tsunami modelling

Institute of Ocean Sciences
Offshore turbidite record
Recurrence – turbidite record

Oldest turbidite, ca. 9800 yrs old
Youngest turbidite, AD 1700

19 full length ruptures – average recurrence 530 yrs
2 ruptures of southern 50-70% of margin
18 smaller ruptures along southern margin
Contributions from geophysicists
Recognition that great earthquakes occur in clusters
The future

- Refined map of the locked zone
- Further refinements in the earthquake chronology
- Tackling the issue of segmentation
- Linkages between interface and crustal earthquakes
- Better understanding of earthquake effects on our infrastructure
The End