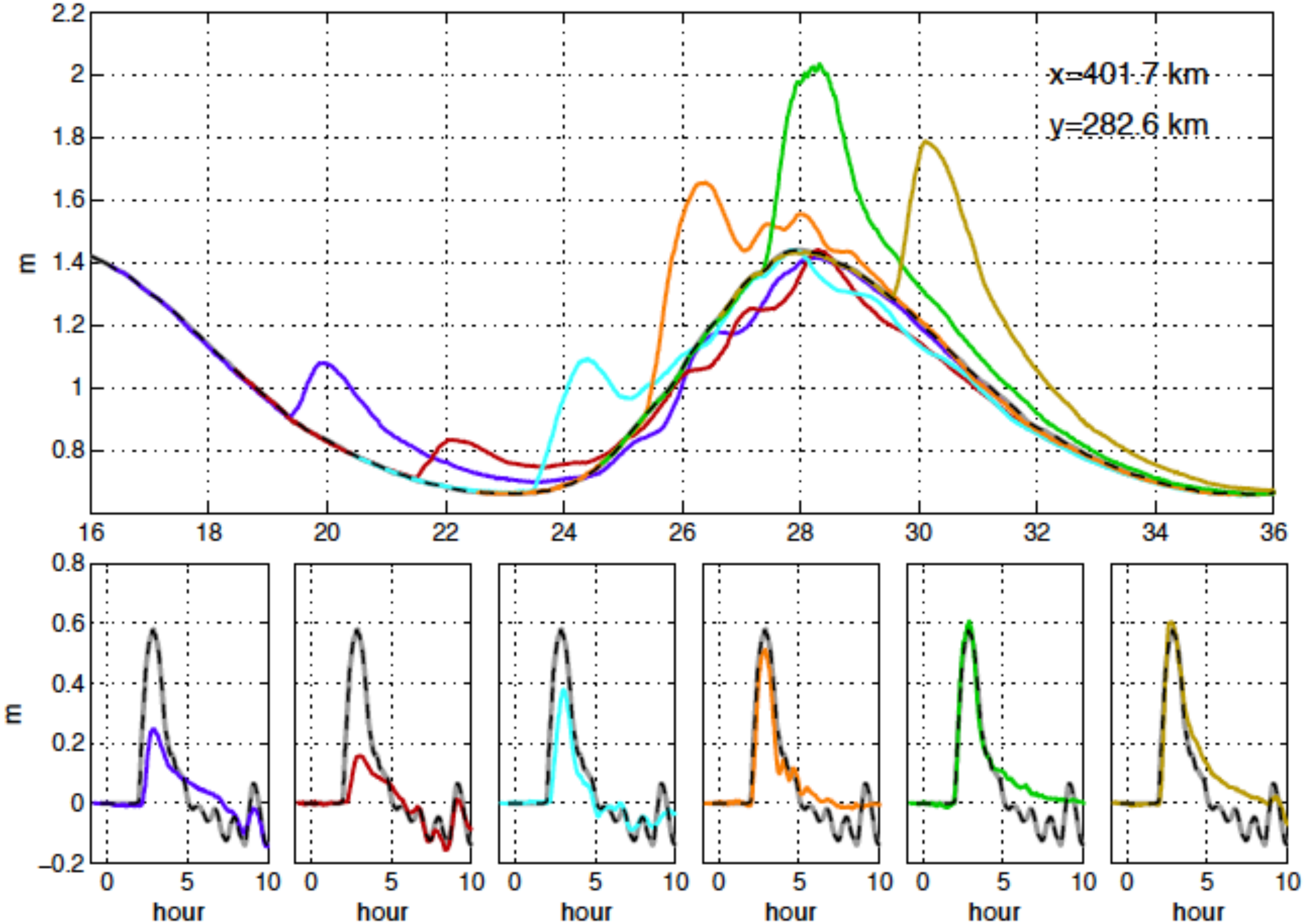
Welcome to the Workshop on Tsunami Hydrodynamics in a Large River

the account for accessing wireless

username: workshop
password: lowMare

- Swift recovery of the geomorphologic change cause by tsunami.
- Tsunami decays very slowly: 15 m → 10 m in 6 km in Kesen River in Rikuzen Takata, Japan.
- There are 5 gage records along the Columbia for the 1964 Great Alaskan Tsunami: 1 ft fluctuation at Beaver, and some measurable record at Vancouver, WA. Different tsunami-height envelop for the first and second waves. Can we use this record for the model calibration?
- There is the tree-ring evidence of the 1700 Cascadia Tsunami (or subsidence) in Price Island, 40 miles up the Columbia River.
- Increase (5%) in tidal fluctuation from 1925 to 2010, and it appears less energy dissipation now due to change in the channel for navigation dredging.
- Rapid variability of the wave field: low to high in a few minutes.

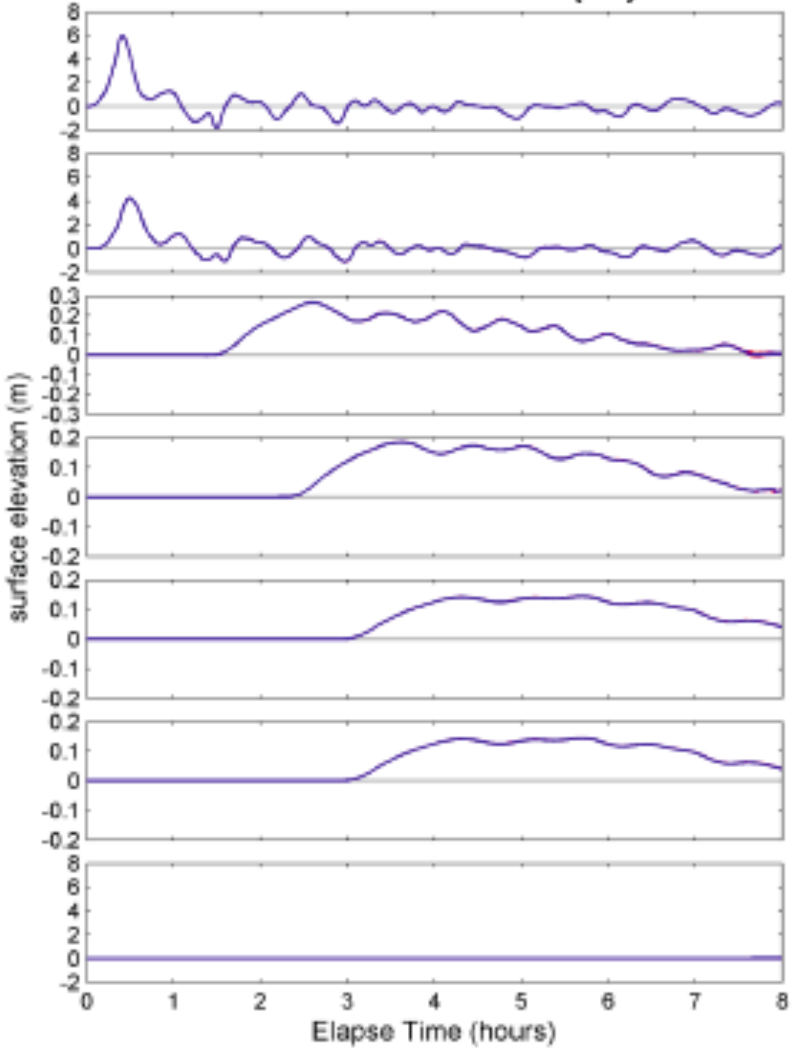
- Hydropower plants create the pseudo tides in the river from the upstream. This makes the river flow seasonal.
- Energy flux divergence (~ energy dissipation) can be obtained from the existing data.
- Spatial water-surface profiles for HHW and LLW are also known.
- We must recognize that the channel was deepened in 1980's.
- There must be locally reflected wave at the channel convergence.
- The existing pile dikes must contribute to friction.
- (Tolkova) Head loss ~ 0.8 m in 70 km (simulation): The effects of tides are analyzed



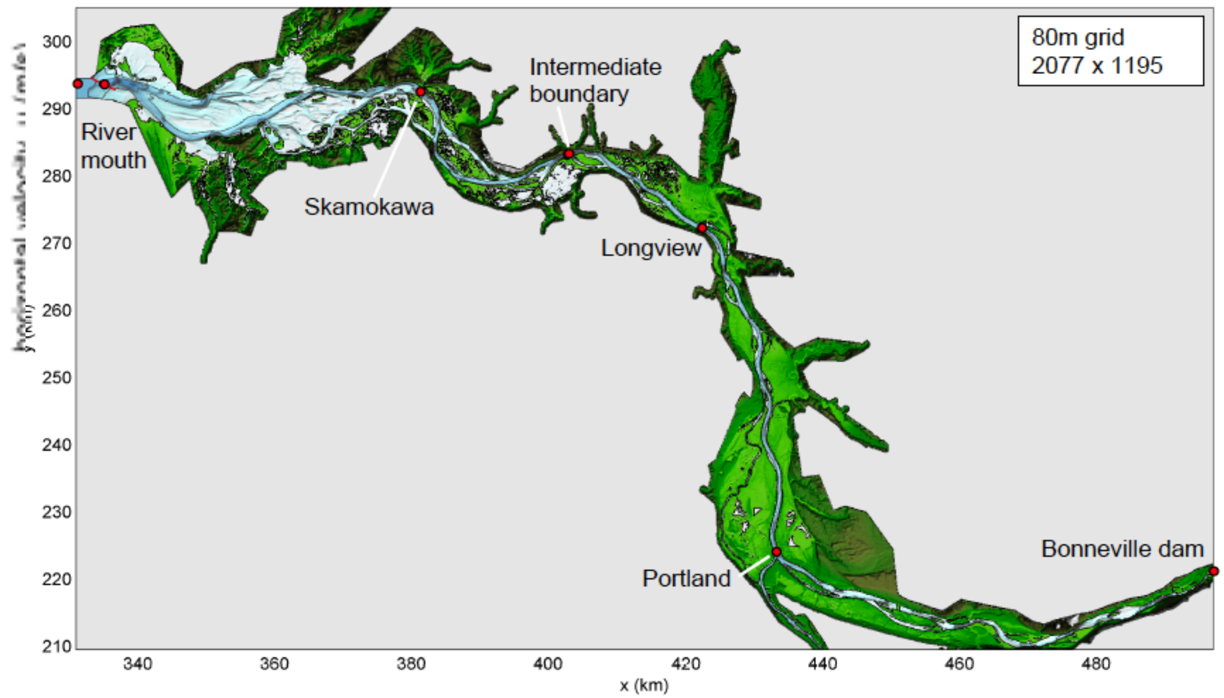
Location 35: near Beaver

- The tidal effect is important but complex. The critical tidal phase cold be different depending on a given locality.
- (Guerra) At Skamokawa, $\eta \approx 1.0$ m; at Beaver, $\eta \approx 1.1 \sim 1.2$ m; tsunami reaches Beaver in 3.5 hours.
- (Yamazaki) used 80 m grid: waveform becomes much longer as it propagates upstream. Wave dispersion and tides are no so important.
- (Zaron) used 40 m and 80 m grid: $\eta \approx 1.5 \sim 1.65$, $t \approx 2$ hours at Beaver; $\eta \approx 1.50 \sim 1.65$, $t \approx 3$ hours at Skamokawa. Grid size might be too coarse. Also the simulated waveform spreads out as it propagates upstream. No difference between the cases with and without including the flood plains.
- (Hill) ADCIRC: sinks (ponding) might cause the problem.

Surface elevation (m)



• Mean Tide Level



August 16

9:00 – 9:10: Review of Day 1 (Zhang and Yeh)

Session 5 – Tsunami Models 3: model description and presentation of the baseline problem
9:10 – 9:40: GeoClaw (George)
9:40 – 10:10: Boussinesq Model (Zhou)
10:10 – 10:40: COULWAVE (Lynett)
10:40 – 10:50: Group Photo

10:50 – 11:10: *Coffee*

Session 6 – Comparisons for Baseline Problem (Zhang)
11:10 – 12:10: How far tsunami can penetrate through the river?
Linear and Nonlinear Shallow-Water-Wave Models, and Boussinesq Models

12:10 – 1:30: *Break*

Session 7 – Sensitivity in Friction Effects (Yeh)
1:30 – 2:30: What would the reasonable friction factor be?
Should it be changed based on the water level? If so, how?

Session 8 – Sensitivity in Tidal Effects (Jay)
2:30 – 3:30: Ebb vs. spring tides
How much does the tidal condition make difference in tsunami runup along the river?

3:30 - 3:50: *Coffee*

Session 9 – Other discussions and future research plans (Yeh)
3:50 – 4:50: What's next?
Any desire to compile and publish the workshop outcomes in the form of the proceedings in a book form?
Any desire to continue research collaboration using the functionality of ISEC: http://isec.nacse.org/ ?
Any desire to initiate a group research program? If so, what topic(s)?

4:50 – 5:00: Closing comments