



Western Washington University
Western CEDAR

Salish Sea Ecosystem Conference

2018 Salish Sea Ecosystem Conference
(Seattle, Wash.)

Apr 5th, 10:50 AM - 10:55 AM

A modeling study of storm surge in the Salish Sea

Zhaoqing Yang

Pacific Northwest National Lab., United States, zhaoqing.yang@pnnl.gov

Taiping Wang

Pacific Northwest National Lab., United States, taiping.wang@pnnl.gov

Ian Miller

Univ. of Washington, United States, immiller@uw.edu

Follow this and additional works at: <https://cedar.wwu.edu/ssec>



Part of the [Fresh Water Studies Commons](#), [Marine Biology Commons](#), [Natural Resources and Conservation Commons](#), and the [Terrestrial and Aquatic Ecology Commons](#)

Yang, Zhaoqing; Wang, Taiping; and Miller, Ian, "A modeling study of storm surge in the Salish Sea" (2018). *Salish Sea Ecosystem Conference*. 162.

<https://cedar.wwu.edu/ssec/2018ssec/allsessions/162>

This Event is brought to you for free and open access by the Conferences and Events at Western CEDAR. It has been accepted for inclusion in Salish Sea Ecosystem Conference by an authorized administrator of Western CEDAR. For more information, please contact westerncedar@wwu.edu.

A Modeling Study of Storm Surge in Salish Sea

Zhaoqing Yang^{1,2}, Taiping Wang¹ and Ian Miller²

¹ Pacific Northwest National Laboratory

² University of Washington

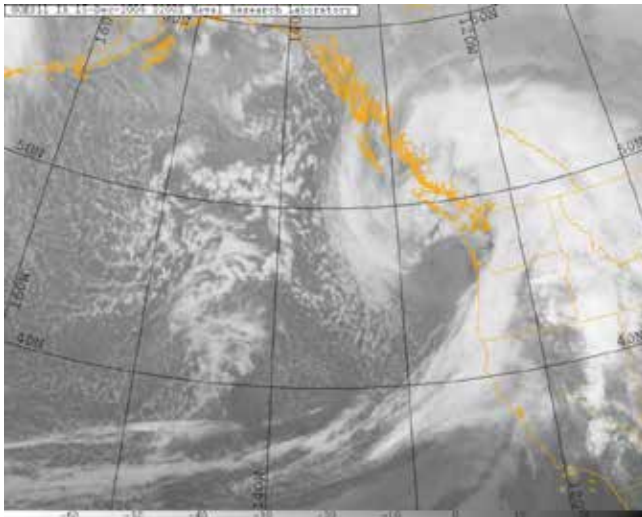
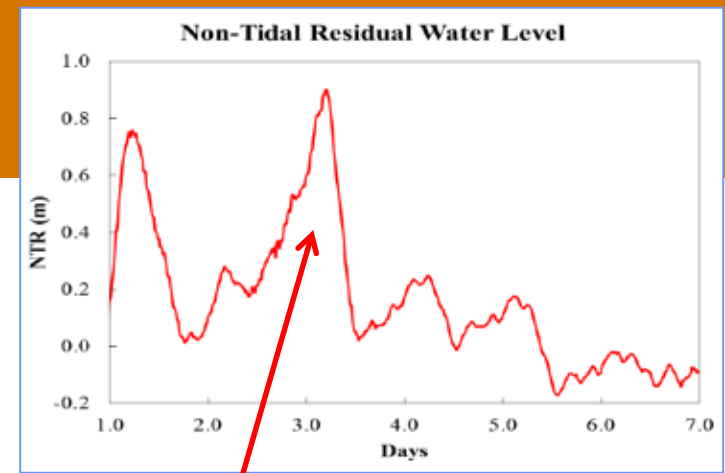
Salish Sea Ecosystem Conference

Seattle, WA

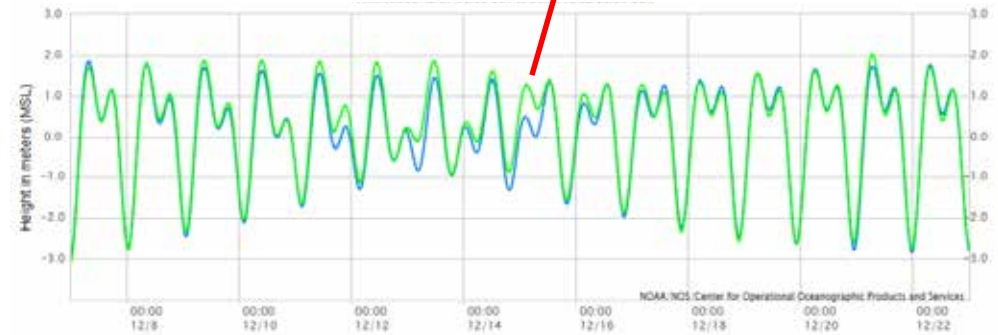
April 4-6, 2018

Storm Surge in Salish Sea

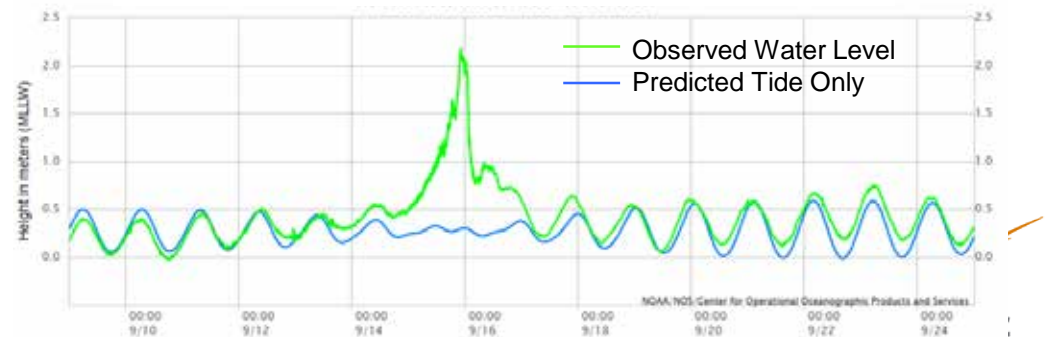
- ▶ We must remove tides to quantify storm surge – **Non-Tidal Residual**



Puget Sound – Hanukkah Eve Windstorm (2006)



Gulf of Mexico – Hurricane Ivan (2004)



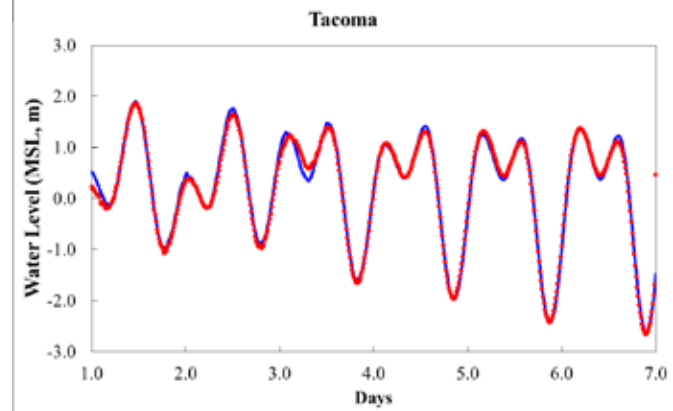
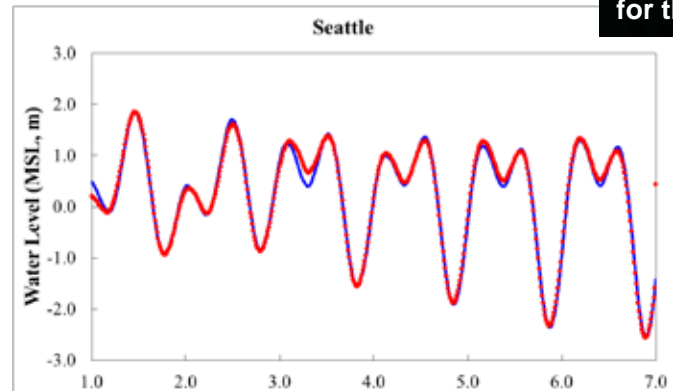
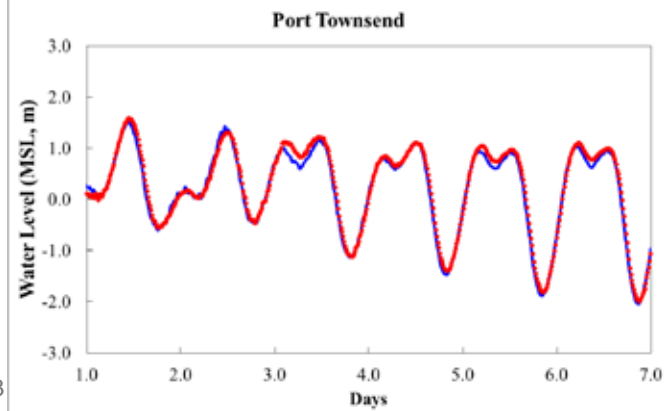
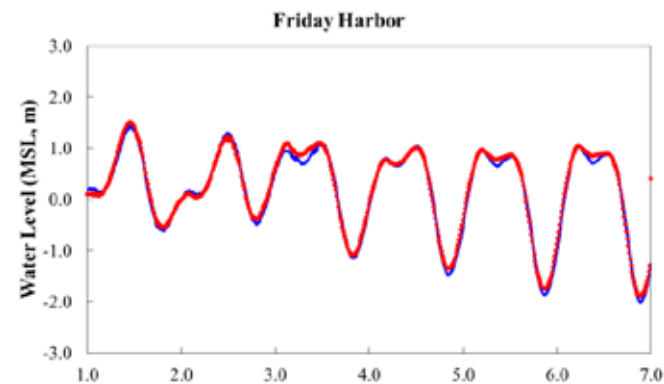
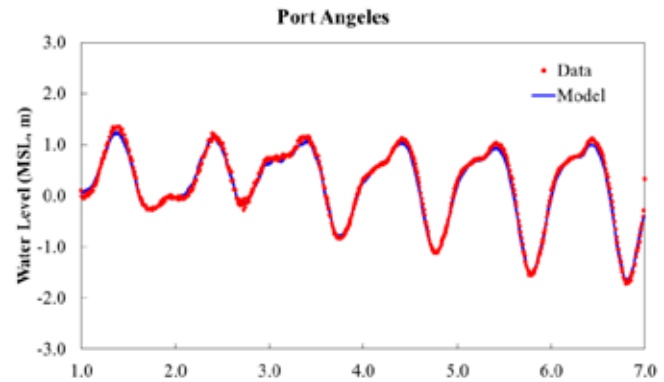
Can we model storm surge in Salish Sea?

Yes, but we can't see the surge with tides



Water levels simulated with PNNL's high resolution Salish Sea storm surge model during Hanukkah Eve Windstorm (2006)

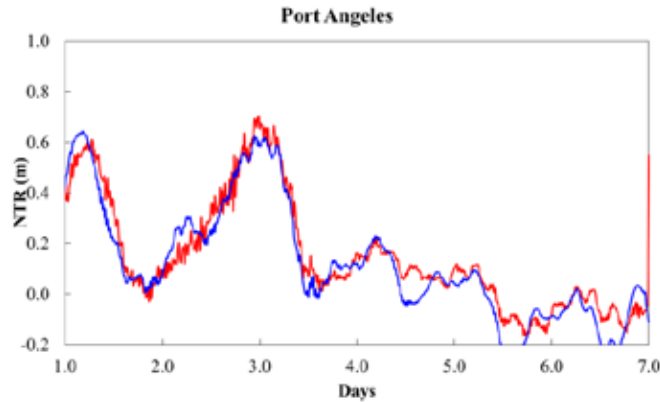
• Data — Model



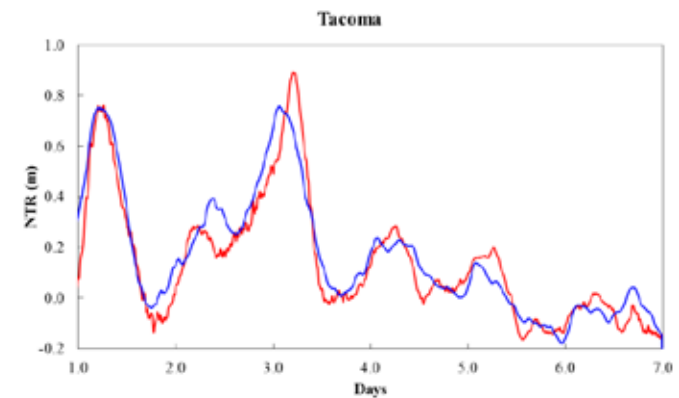
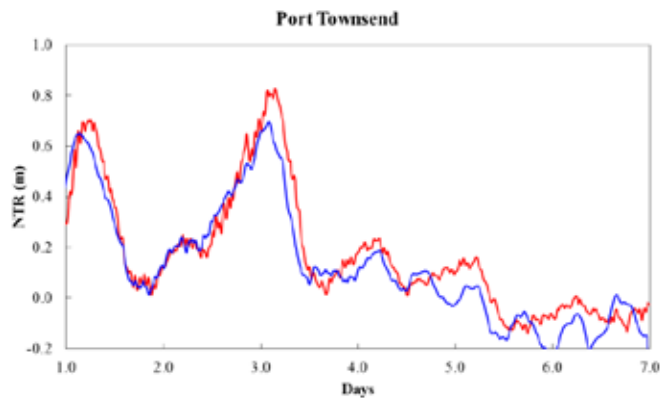
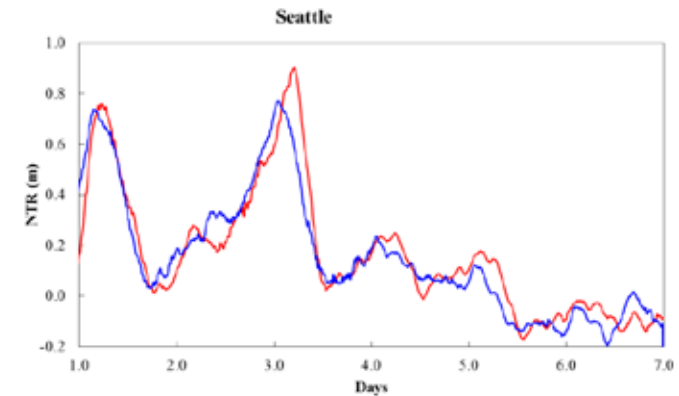
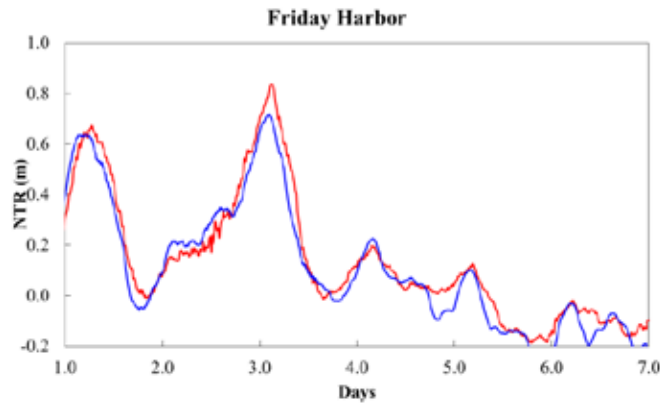
But if we removed tides...



Storm Surge induced by Hanukkah Eve Windstorm (2006)



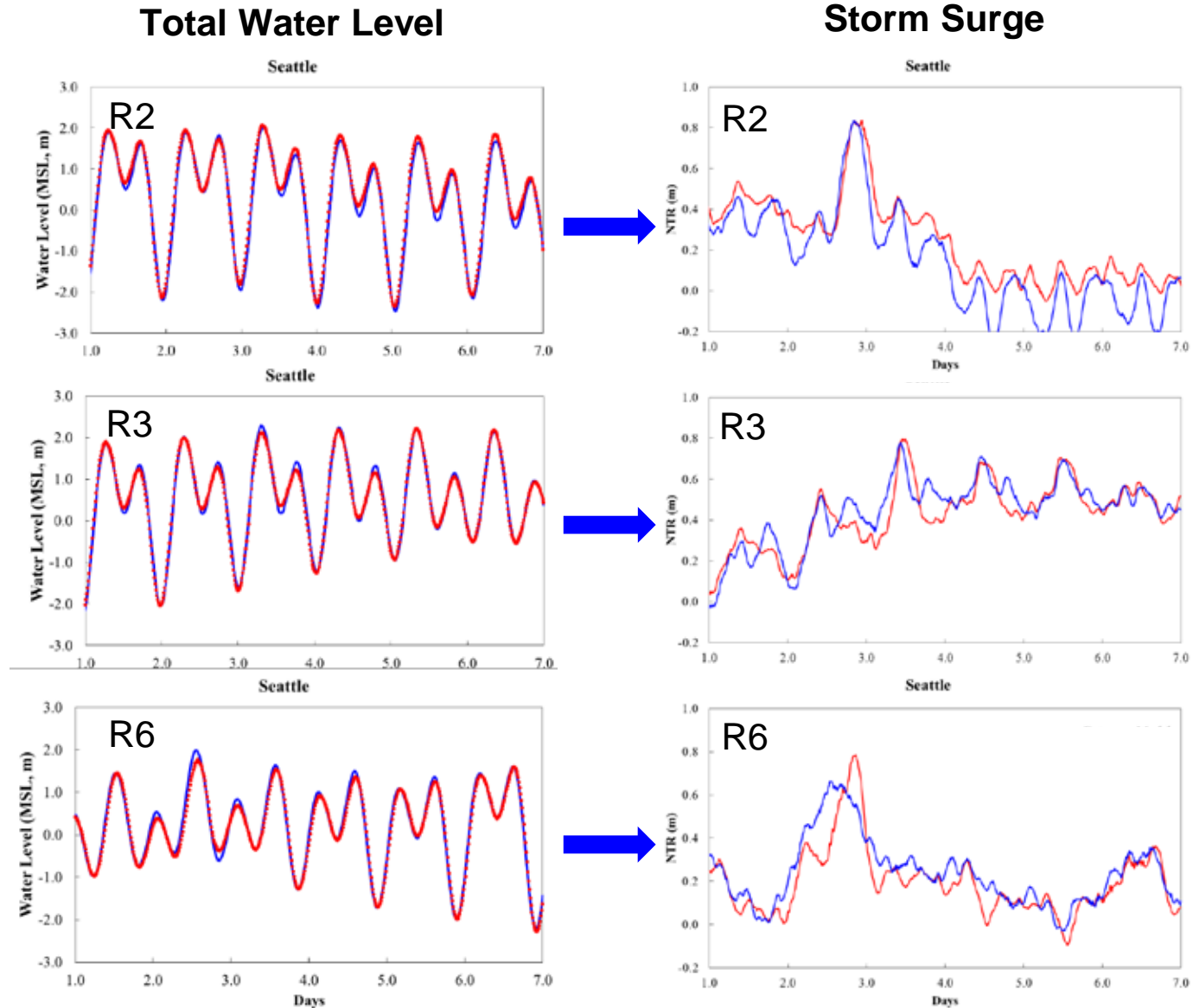
— Data — Model



Same for other top ranked storm events

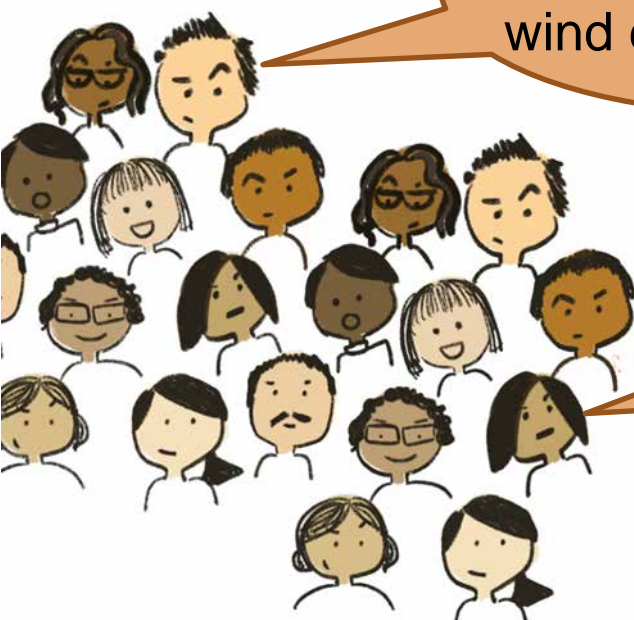
• Data
— Model

Rank	Time
1	12/15/2006 13:00
2	12/13/2015 05:00
3	1/18/2010 19:00
4	12/16/2002 14:00
5	1/1/1997 16:00
6	11/16/2006 04:00
7	1/27/1983 12:00
8	12/12/1995 22:00
9	11/25/1998 11:00
10	12/11/2014 20:00



And we also found...

Storm surge in Salish Sea is mainly set up by offshore wind and pressure, while *the effect of local wind is secondary*



Oh, really?
But how about local
wind effect on waves?

Good question!
That would be
important.

How come?

Come to my talk
on “Modeling wind-induced
waves in Salish Sea”
Friday, 1:30 – 3:00 pm
Paper SSE5-230



UNIVERSITY of
WASHINGTON



Pacific Northwest
NATIONAL LABORATORY