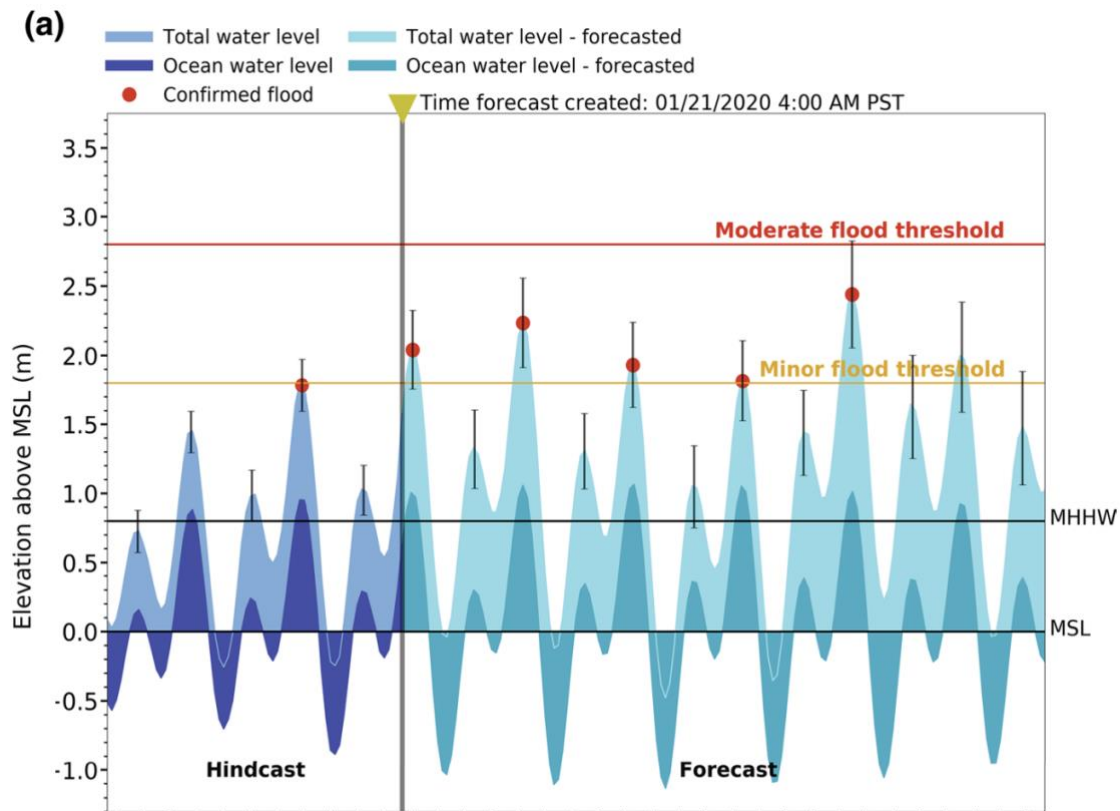


# An early warning system for wave-driven coastal flooding at Imperial Beach, CA

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## Plain word summary

This work develops a warning system to predict overtopping caused by energetic winter swell and high tides at Imperial Beach, CA. To predict flood probability, the system uses total water level forecasts, tides, and wave runup estimated from the SWASH simulation for nonlinear surfzone wave evolution. The simulations are computed for many of the storm wave conditions identified in the CDIP Regional Monitoring and Prediction system that calculates the incident wave spectrum at alongshore locations in San Diego based on the measurements from the network of CDIP wave buoys off the coast. This warning system was used to provide better flood forecasts to city food response and management in Imperial Beach, and could be applied to other locations to help assess vulnerability to storm impacts.



**Fig. 11** Hindcasts and forecasts of TWL at Cortez Ave. **a** The ocean water level (dark colors) and  $R_2$  (light colors) combine to form TWL. A forecast out to 6 days, made at 7:00 pm PST 21 January 2020, is appended to the hindcast elevation above MSL. Error bars at high tide are  $\pm 1$  RMSE. Red dots indicate time of a confirmed flood. MHHW (mean higher high water) is also shown. **b** The probability that the TWL will