

Ocean Monitoring & Prediction at Surfline, Inc.

By Mark Willis
2018 AMS Washington Forum



About Surfline

- Founded in 1985
- Started mainly for SoCal surfers
- Now Global – Surf, Fish, Marine
- Recently acquired our biggest competitor, Magicseaweed.com
 - Now serve over 4 million a month.
- ~80 Employees.
 - 10 Mets
 - 4 Wave Modelers/Data Engineers
 - Lots of Contractors
- Business – subscriptions, advertising, consulting
- Wide range of relationships with academia and government agencies.



Sean Collins
1952-2011



Marine Meteorologists

- Primary responsibility to provide value-added surf reports and forecasts 365-days a year.



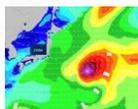
Marine Meteorologists

- Official Forecast duties for 50 surf contests, 6 fishing tournaments.
 - Inclusive of the 11 "World Championship Tour" events in the World Surf League.

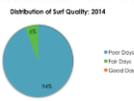
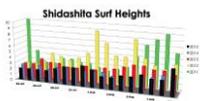


Marine Meteorologists

- Other Decision Support – I.E. 2020 Olympics Historical Analysis



Typhoon Noru (2017)



HD Cams - ~450 on Surfline Platform

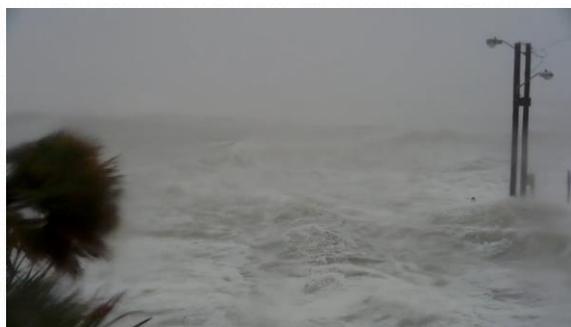


How we use cams...



Non Recreational Uses of Surfline Cams

- Media Syndication Platform
- Lifeguards
- NWS
- USGS
- WebCAT Project



Web Cam Applications Testbed – “WebCAT”



Recently installed cams for “WebCAT” – NOS supported project to monitor and analyze coastal hazards/change via Surfline cams



WebCAT – Wave Runup

- The USGS is using Surfline cameras to observe changes in water levels and beach shape/size.
- Each hour the position of the water level on the beach is tracked for comparison to models of coastal water levels and hazards such as beach and dune erosion.
- NWS also using for Coastal Flood Operations.



WebCAT – Rip Currents

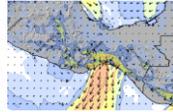
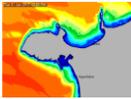


NOS/NWS Rip Current Model has relied on lifeguard observations in the past. This approach is limited by lifeguard presence and subjective nature of visual observations. Cams can help!



Data Science/Modeling at Surfline

- Global and Regional Wave Models (various versions of WW3) + Assimilation
- Proprietary nearshore modeling system forcing 5K spot forecasts.
- Proprietary back end validation system.
- WRFs globally



New Assimilation Scheme: Spotter Observations



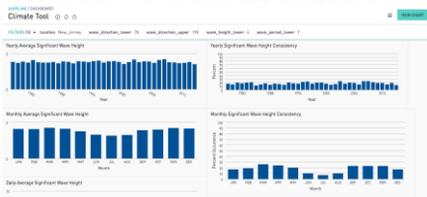
Surfline wave model "LOLA" with no assimilation.



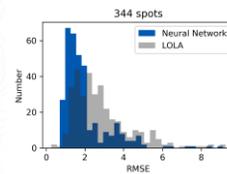
Same model with observations assimilated.

Internal Wave Climate Tool

Slice and dice historical data however we want



Data Science – Machine Learning



Machine learning based shoaling algorithm showing promise compared to traditional physical approaches.

Thank You...