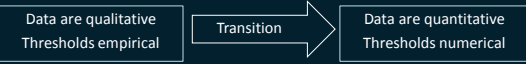


### Marine Weather Decision Making

1950

2050



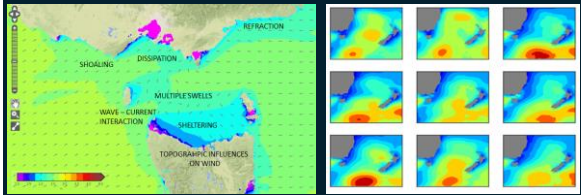
In 2015 people and industries operate somewhere along this spectrum.

The key parameter in the decision making process is the perception of safety:

- GREEN we feel safe and comfortable, everything is fine
- YELLOW its ok but we are a bit worried about .....
- RED this is dangerous we should not be out here doing this
- INGORANCE we are unaware of the risk profile

Assumption – humans are smart and adaptable. People are good at their job.

### The technical challenge

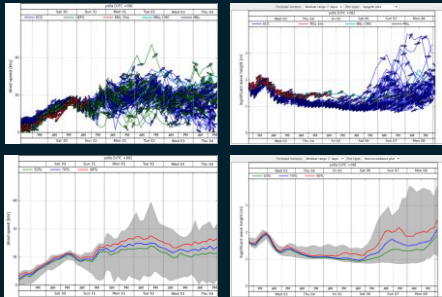


The ocean is a complex energy flux, often exhibiting strong spatial gradients.

T+96h wave height ensemble members - temporal variability.

The consequence of living on a wet, rotating planet is chaotic weather.

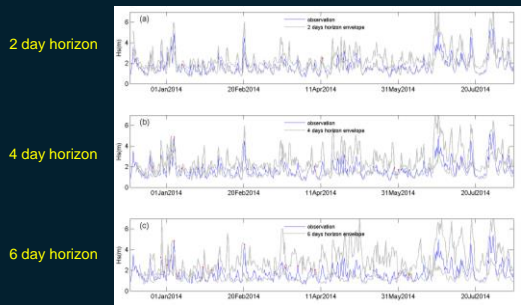
### Forecasting the uncertainty



Wind

Wave

### Forecasting the uncertainty - validation



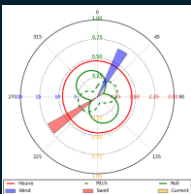
2 day horizon

4 day horizon

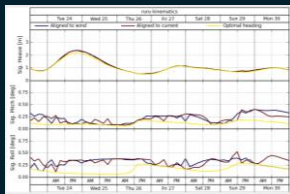
6 day horizon

### Forecasting complex things – vessel motion

Forecast 2D wave spectra convolved with RAO = motion forecast solutions



Heave/roll/pitch amplitude as a function of heading



Time series forecast of vessel motion

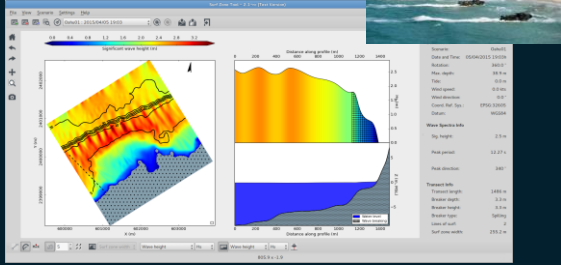
### Forecasting complex things – vessel motion



Going one step further is forecasting the crane boom motion and then the movement of the load throughout a lift.

### Forecasting something complex and making it simple

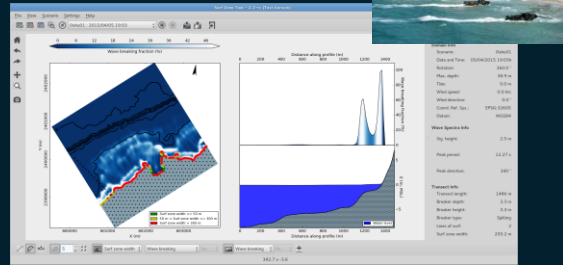
Tactical tools for amphibious naval operations.



POWERFUL WEATHER INTELLIGENCE.

### Forecasting something complex and making it simple

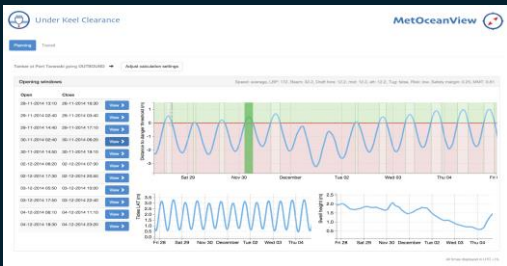
Tactical tools for amphibious naval operations.



POWERFUL WEATHER INTELLIGENCE.

### Forecasting something complex and making it simple

Safe under keel clearance windows for harbour transits



POWERFUL WEATHER INTELLIGENCE.

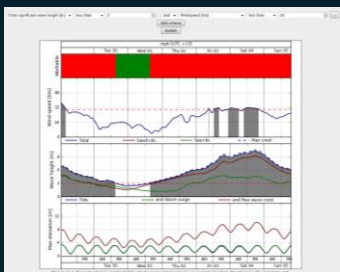
### Forecasting something complex and making it simple

Under Keel Clearance



POWERFUL WEATHER INTELLIGENCE.

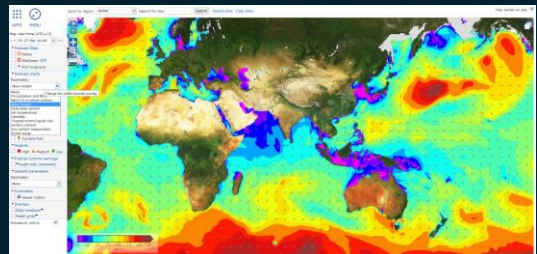
### Making it very simple



A literal interpretation of safe operations based on multiple parameters.

POWERFUL WEATHER INTELLIGENCE.

### If humans are smart and adaptable.....



Make easy-to-use tools for users and industry to improve their knowledge and make an intelligent transition. Don't limit the available data for decision makers.

POWERFUL WEATHER INTELLIGENCE.