



European Harbour Masters' Committee

**EHMC**

# **(BIG) CONTAINER VESSELS** IN EUROPEAN AND NORTH AFRICAN PORTS



## **8<sup>th</sup> EHMC** *seminar*

Thursday 28 - Friday 29 May 2015

Grand Port Maritime de Marseille, France

# *Improving Weather & Wind Forecasts for Ports*

Paul Hutchings, 15

**(BIG) CONTAINER VESSELS**  
IN EUROPEAN AND NORTH AFRICAN PORTS

**VAISALA**





Lava and ash explode out of the caldera of Iceland's Eyjafjallajökull volcano

Photo: REUTERS

# Costs of Eyjafjallajökull

- Main effects lasted 8 days
- 48% of total air traffic was grounded
- 10 million passengers delayed
- Fed-EX grounded 100 flights (switched to roads)
- BMW halted production in 3 German plants.
- Cost air industry 1.3 Billion Euros



- [http://www.mowe-it.eu/wordpress/wp-content/uploads/2013/02/Mowe\\_it\\_Guidebook\\_maritime\\_transport.pdf](http://www.mowe-it.eu/wordpress/wp-content/uploads/2013/02/Mowe_it_Guidebook_maritime_transport.pdf)

## Maritime Weather and Instrumentation

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### SOLUTIONS



Coast



Port



Offshore



Ship

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# MOWE-IT

- Reduce weather related accidents in the Open Sea
- Reduce weather related accidents in and around ports.
- How? By identifying **existing** practices and then **developing** methodologies.



# Weather Related Accidents – in context...

- Accident Frequency – Lloyds Register
- 20,000 merchant shipping fleet >100 tonnes
- Multiple heavy weather accidents per week





The crew of this broken container ship were rescued  
with the help of Inmarsat safety services



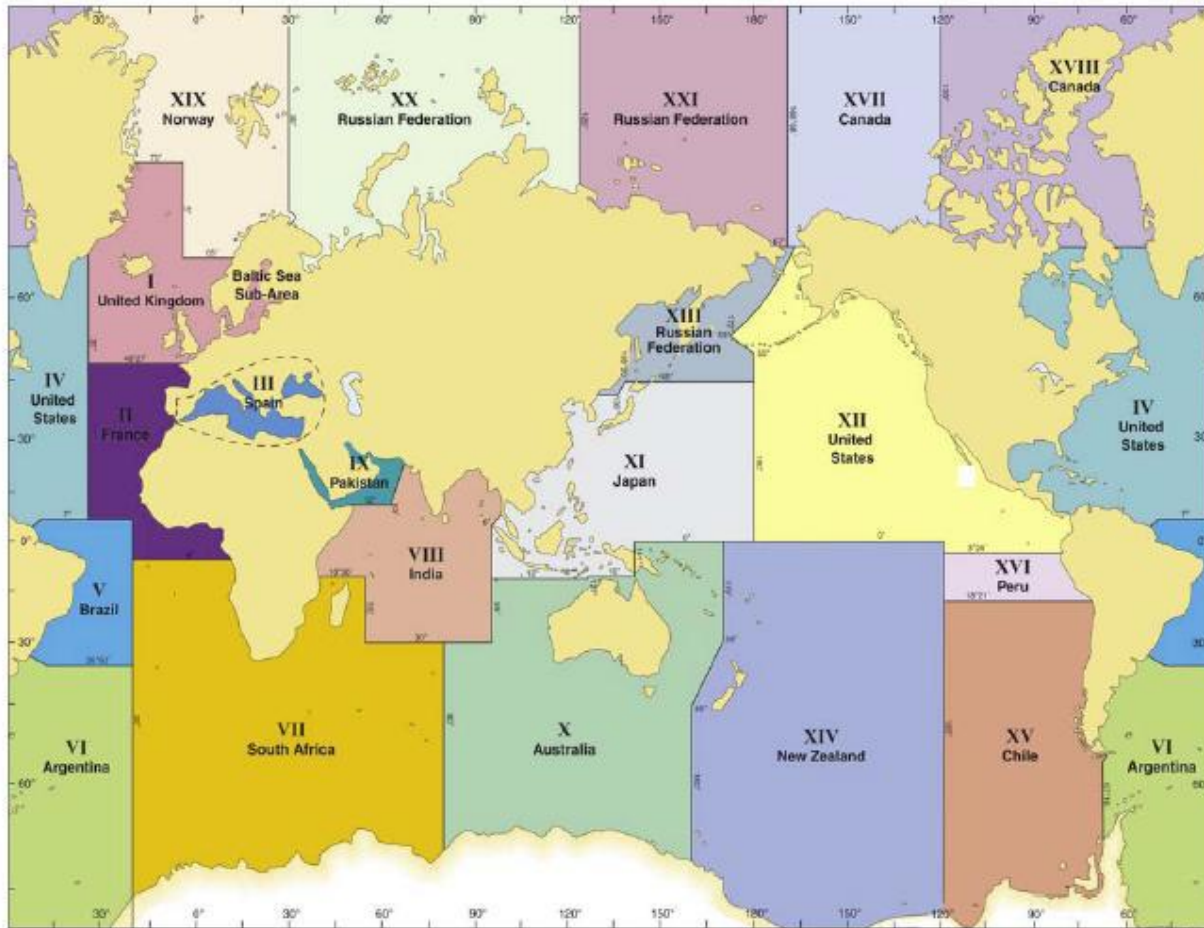
# Weather & Wind Forecasting







# Communication of weather information



WMO is the recognised authority.

The World is divided into 21 Regions (NAVAREAS or METAREAS)

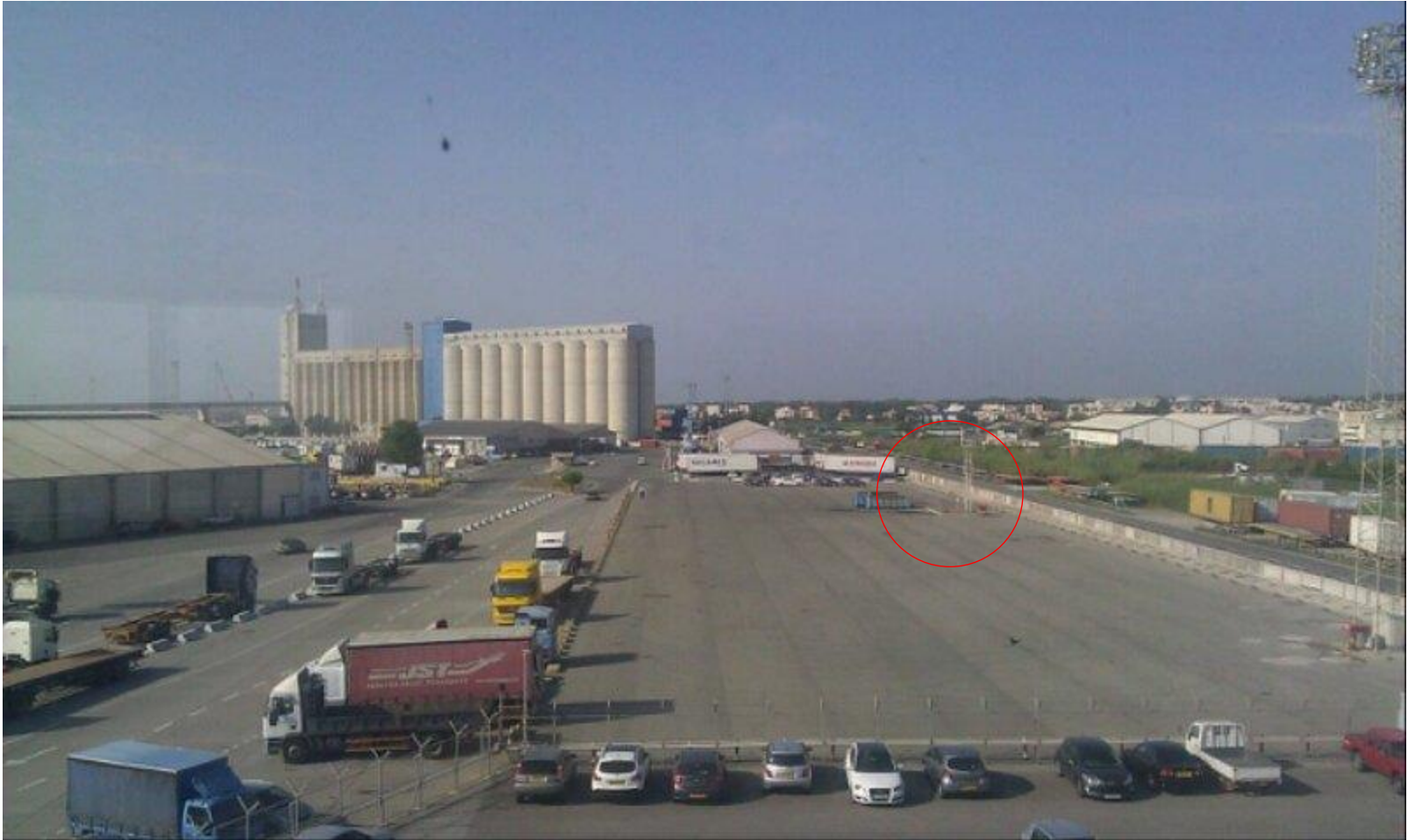
Each has a national government responsible for navigation and weather warnings.

MSI – Maritime Safety Information – co-ordinated broadcasts

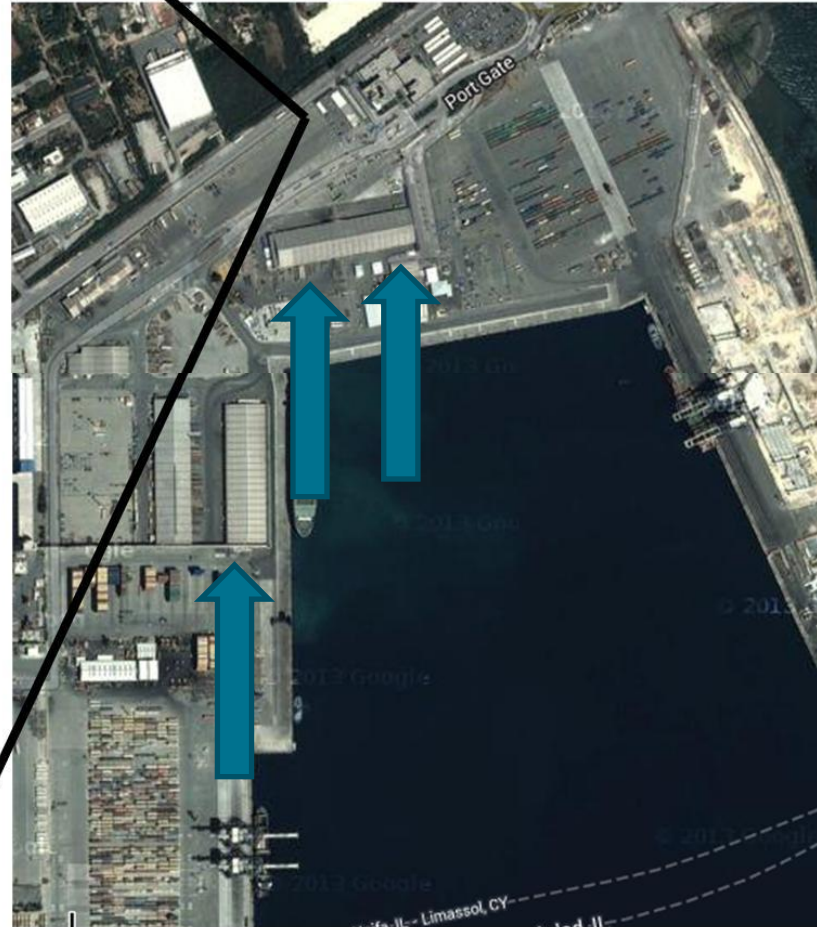
**However...**

**...there is always something!**

# The Devil is in the Detail





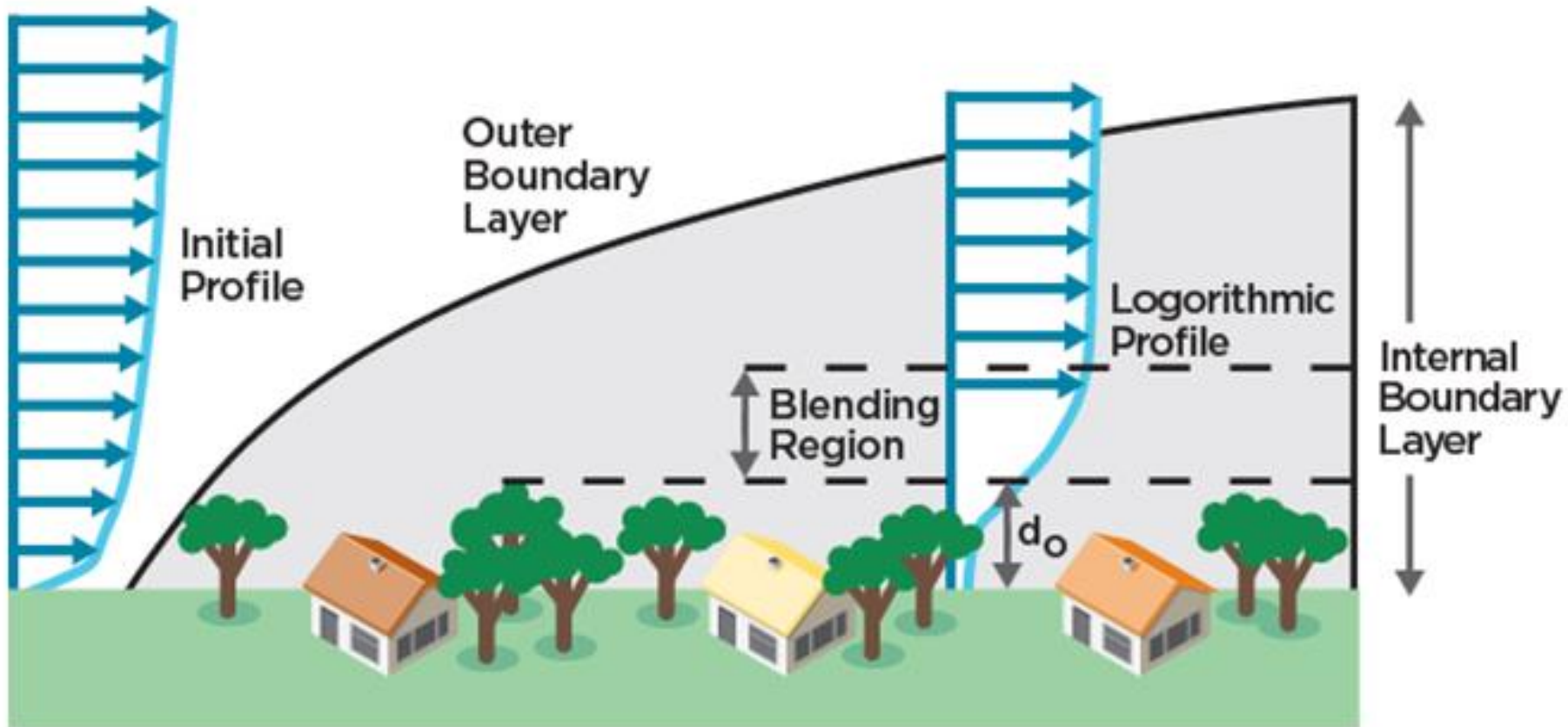




# The Devil is in the Detail



# Sensor Locations



# Ultrasonic v Mechanical Wind

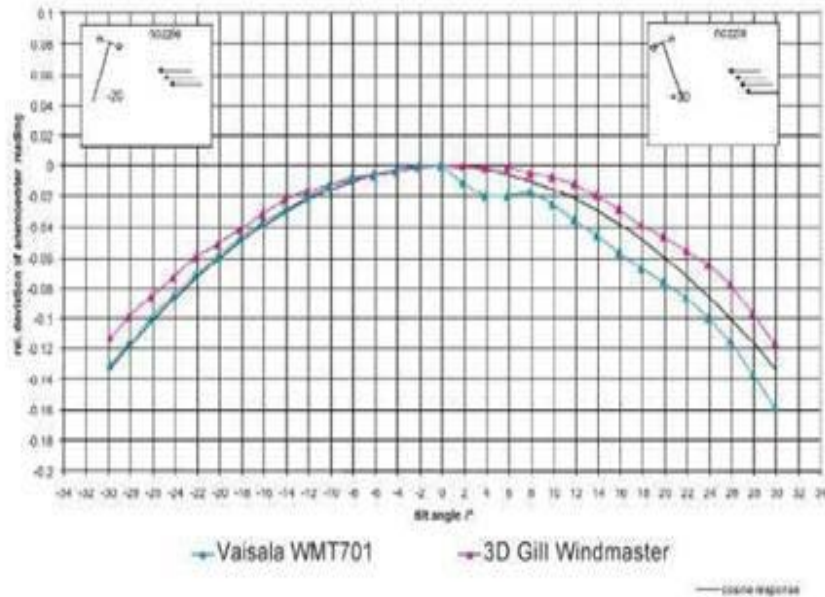


Figure 3. Ultrasonic wind sensor tilt responses [5].

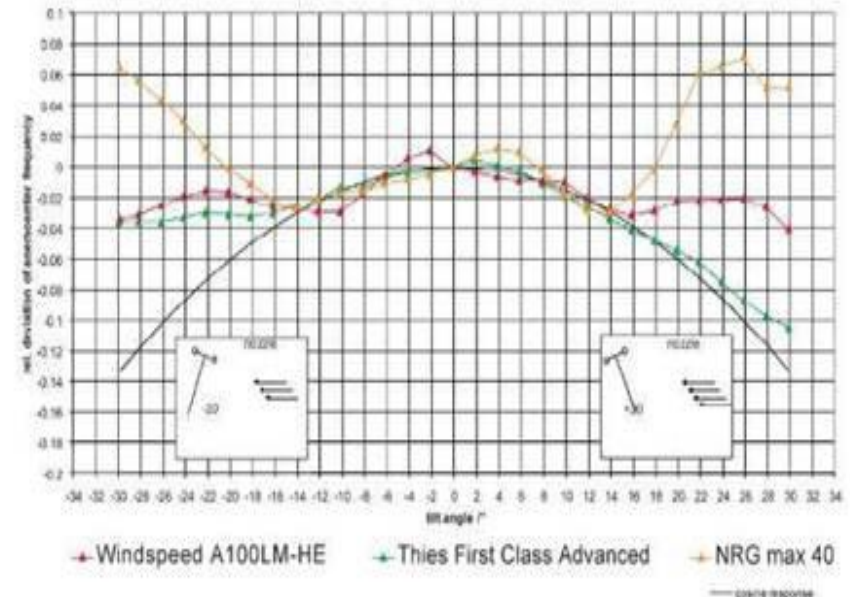


Figure 4. Mechanical anemometer tilt responses [6].

EWEA The European Wind Energy Association

Wilson N., Paldanius J., and Hietanen J. 2012. EWEA. Copenhagen, Denmark. April 16th - 19th 2012. PO.90.

# Small inaccuracies multiply up...

- wind speed =  $x$  (3% error?)
- force of gust against vessel area =  $x^2$  (9% error?)
- sustained volume of wind =  $x^3$  (27% error?)



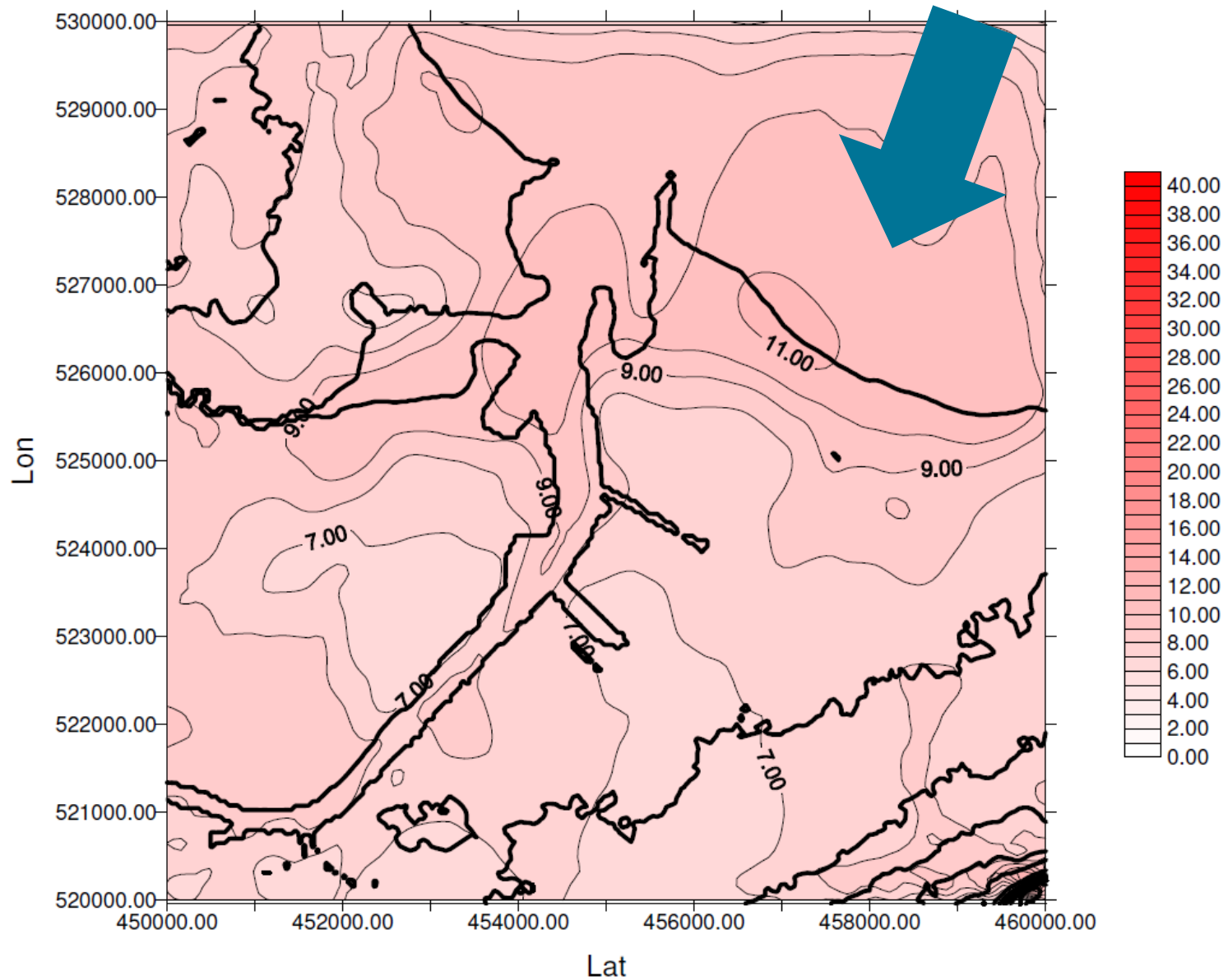
**Sensor Locations...**

**...across a geographical area.**

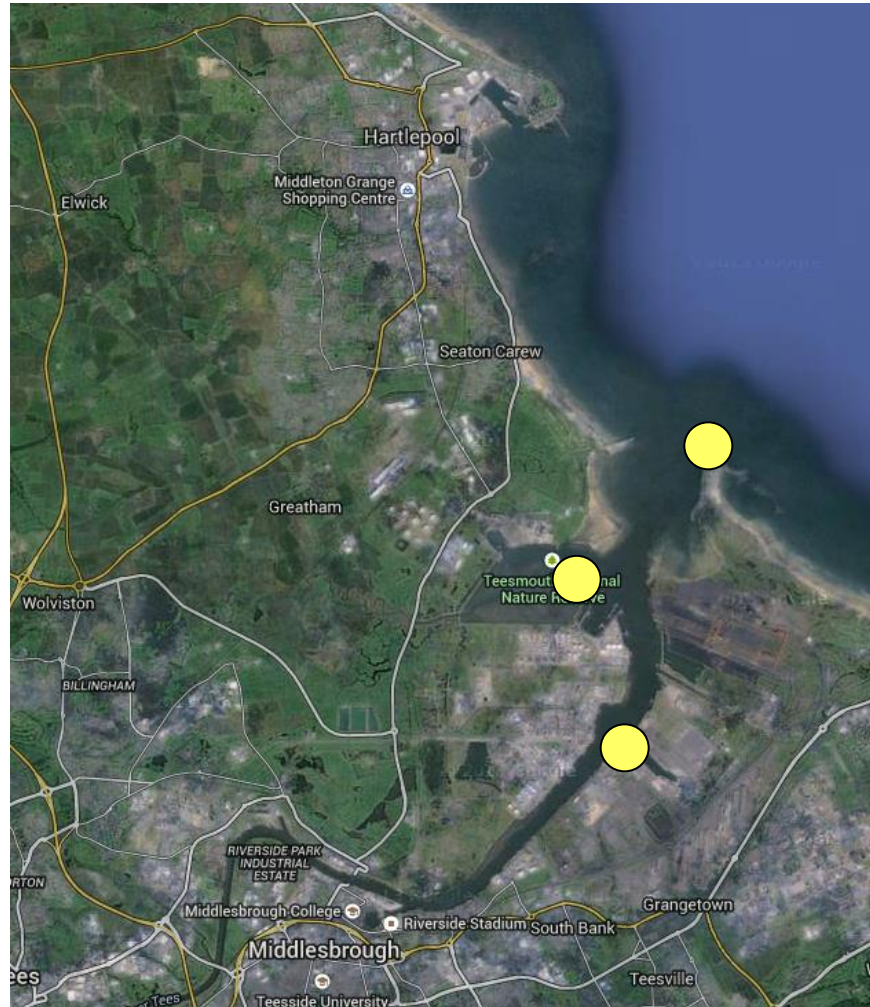
**The significance of wind direction.**




**WIND MAPS**

Mean wind speed (m/s) at height 10m, with 22.5 degrees approach and speed 8.3 m/s.

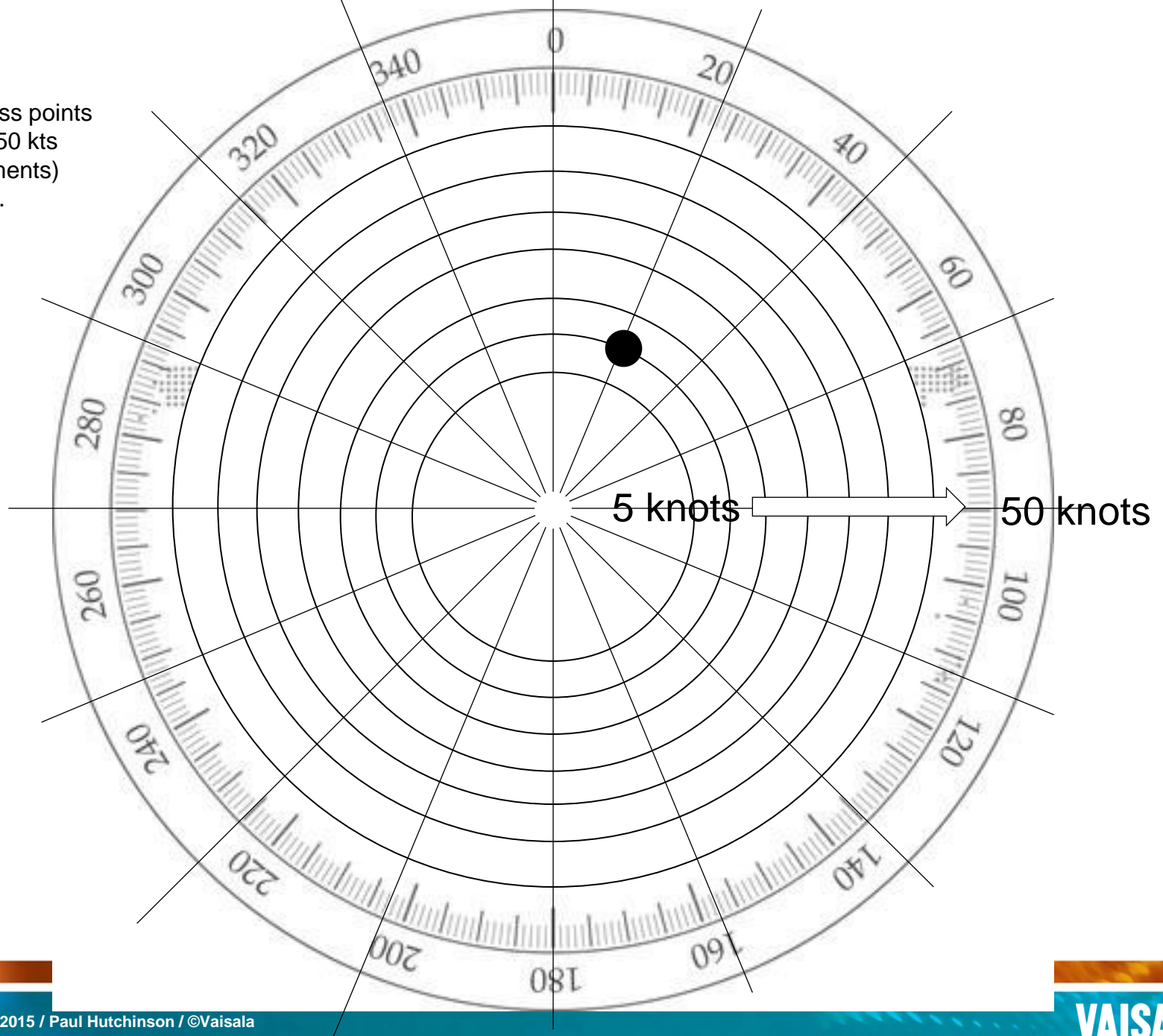


# Wind Threshold Traffic Lights



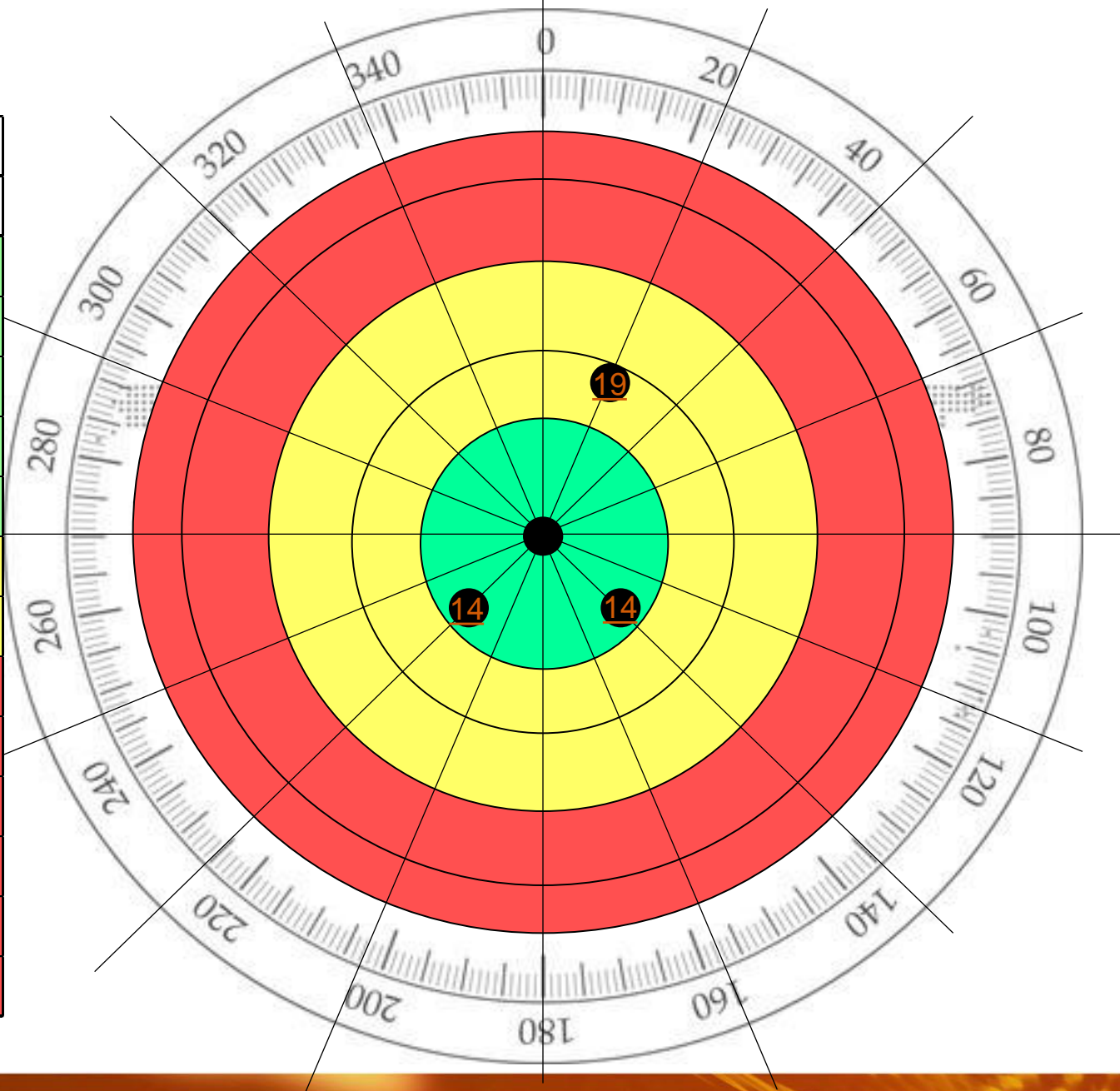
-  SAFE to Proceed
-  Caution / Assisted
-  No Movement Allowed

16 compass points  
from 5 to 50 kts  
(13 increments)  
156 maps.

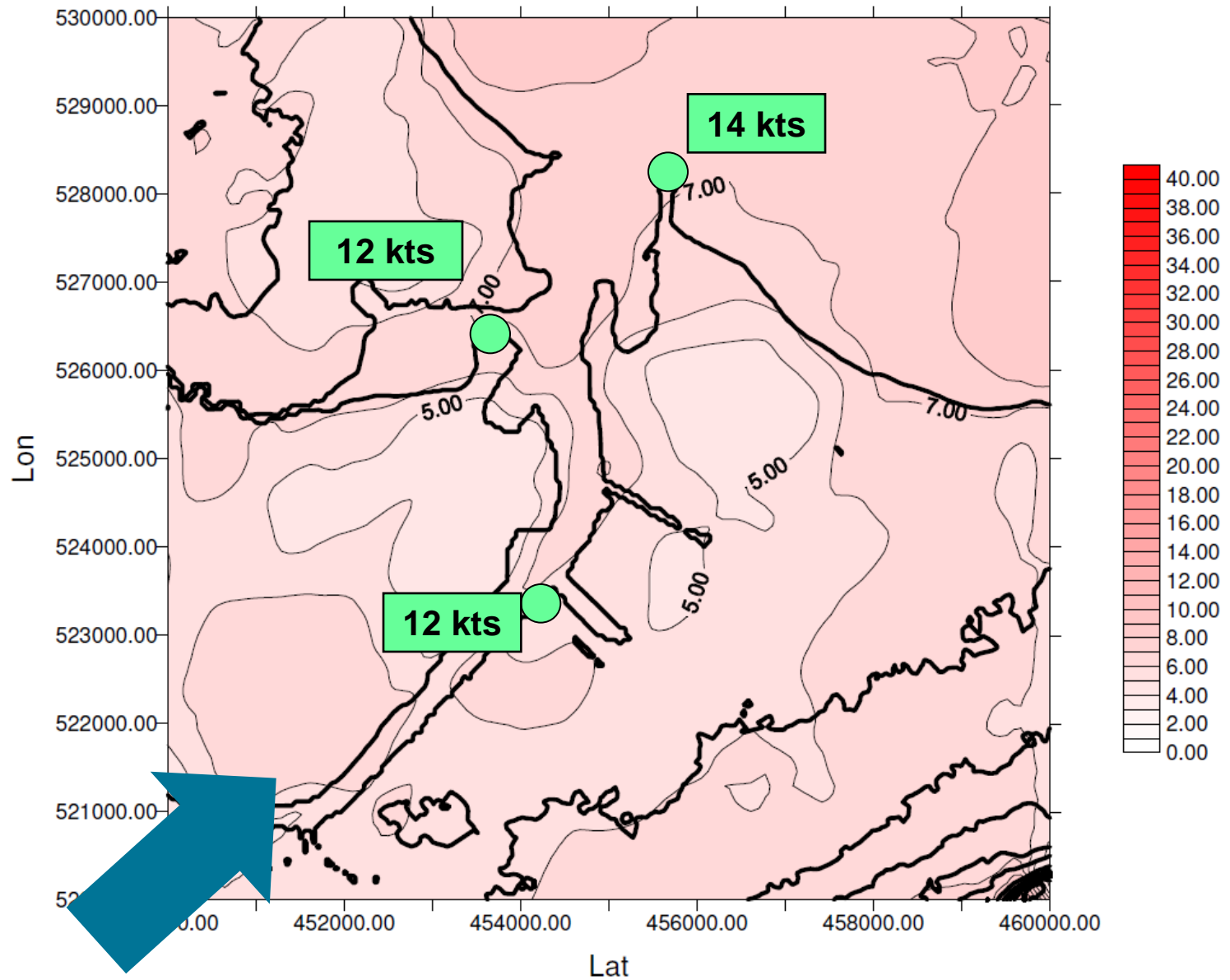




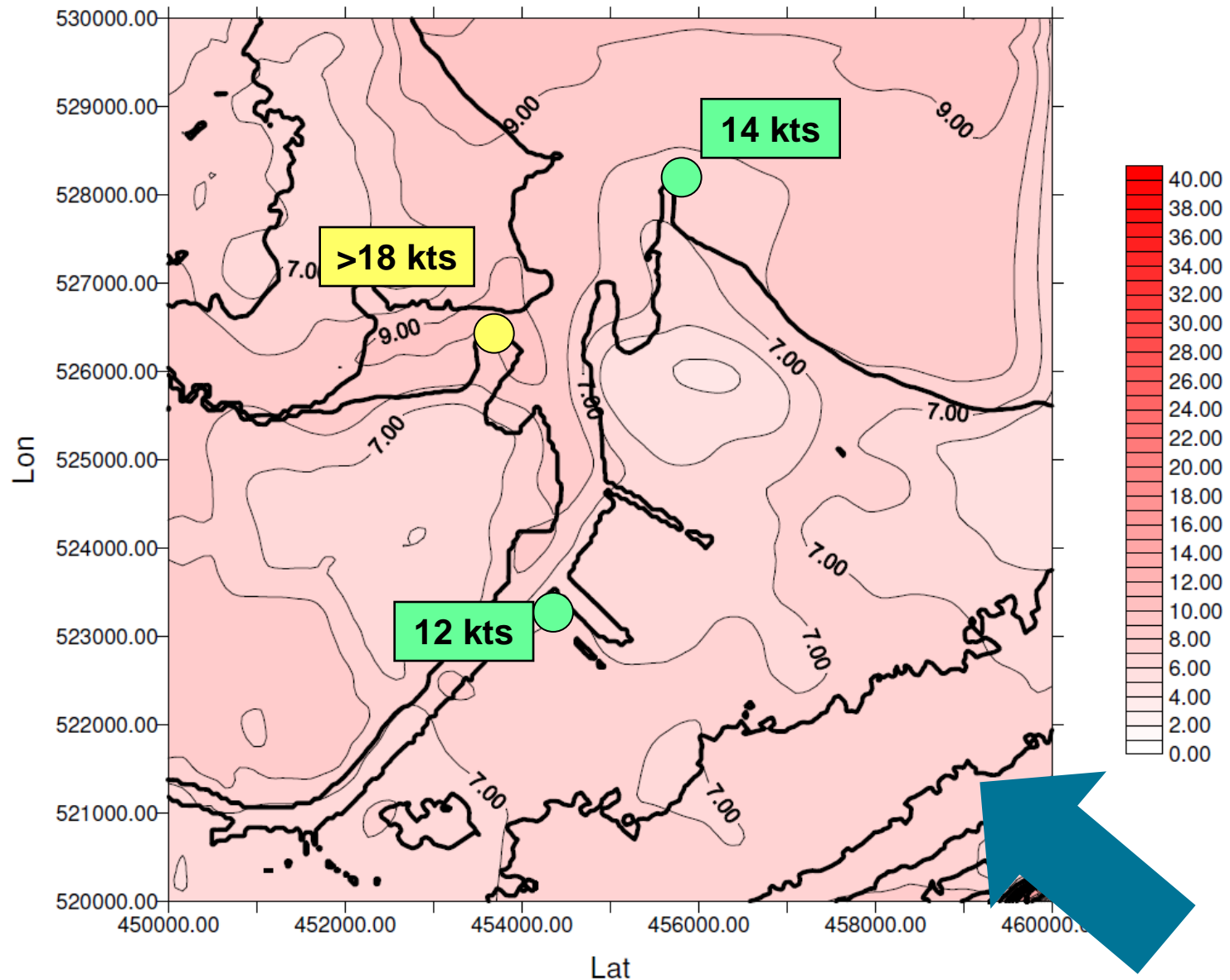
		Wind Speed	
Beaufort Number	Description	kts	m/s
0	Calm	0 - 1	0.0 - 0.5
1	Light Air	1 - 2	0.5 - 1.0
2	Light Breeze	3 - 6	1.5 - 3.1
3	Gentle Breeze	7 - 10	3.6 - 5.1
4	Moderate Breeze	11 - 15	5.7 - 7.7
5	Fresh Breeze	16 - 20	8.2 - 10.3
6	Strong Breeze	21 - 26	10.8 - 13.4
7	High Wind, Moderate Gale, Near Gale	27 - 33	13.9 - 17.0
8	Gale, Fresh Gale	34 - 40	17.5 - 20.6
9	Strong Gale	41 - 47	21.1 - 24.2
10	Storm, Whole Gale	48 - 55	24.7 - 28.3
11	Violent Storm	56 - 63	28.8 - 32.4
12	Hurricane	64	32.9



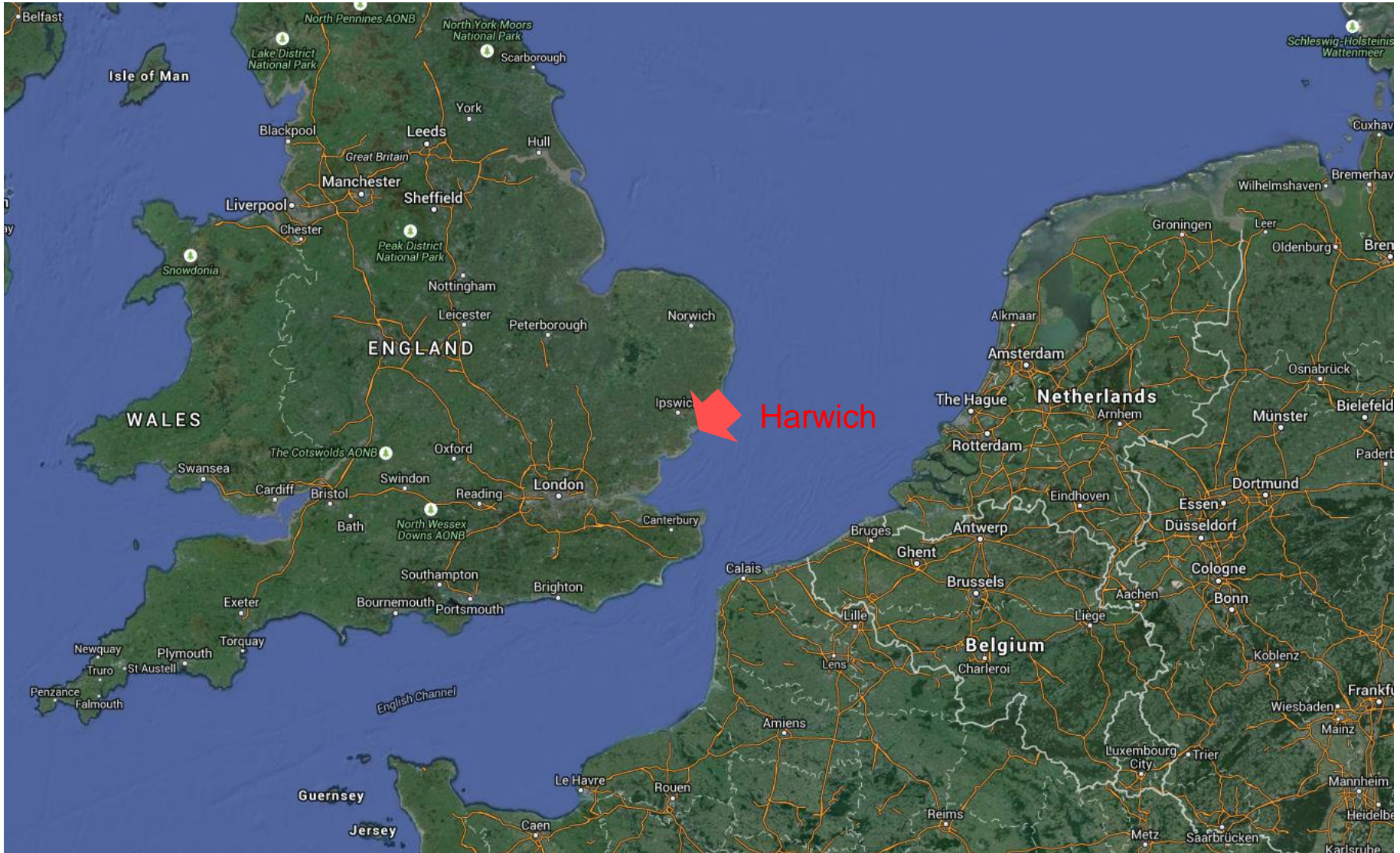
Mean wind speed (m/s) at height 10m, with 225 degrees approach and speed 6.2 m/s.



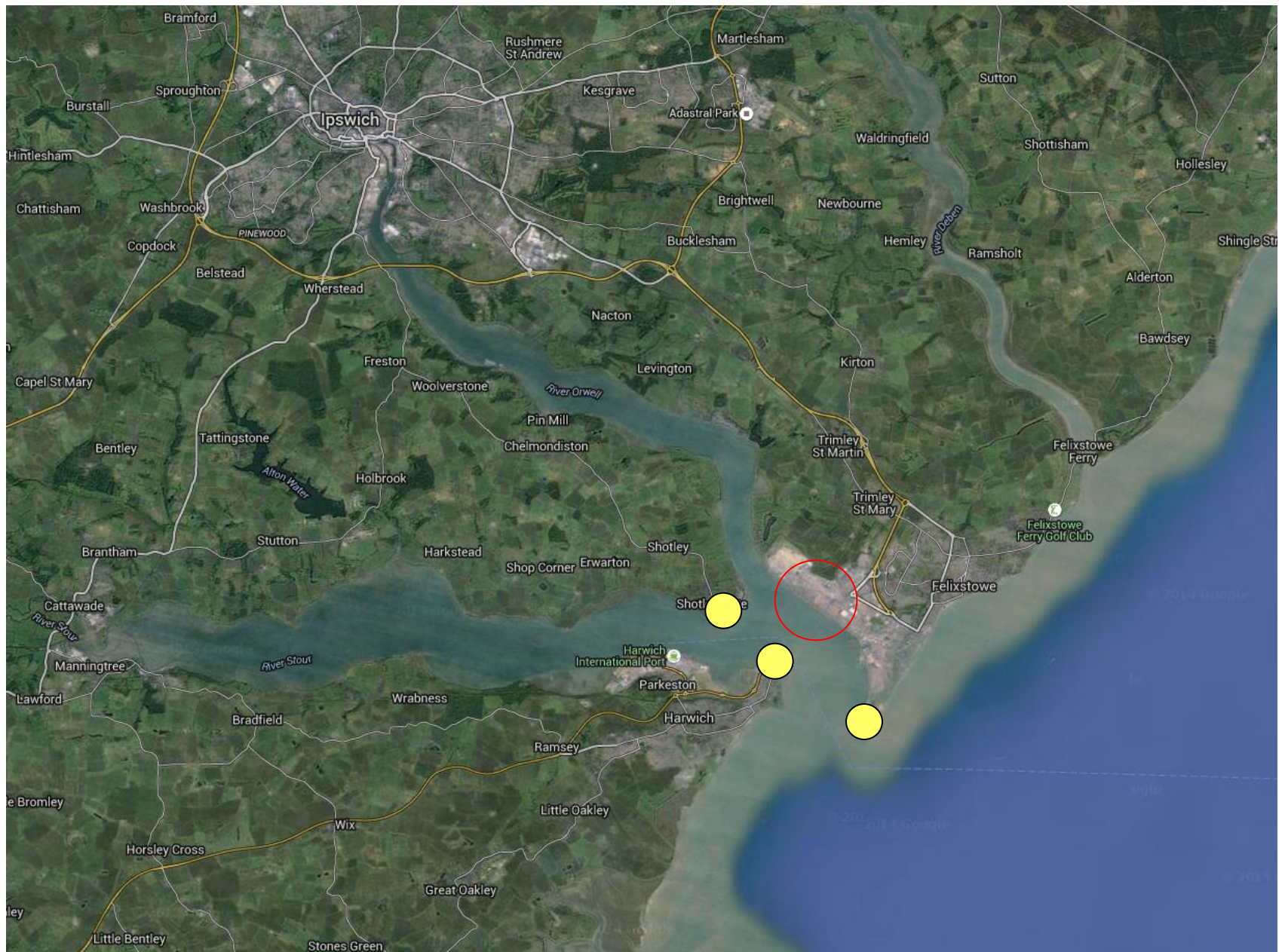
Mean wind speed (m/s) at height 10m, with 135 degrees approach and speed 7.3 m/s.







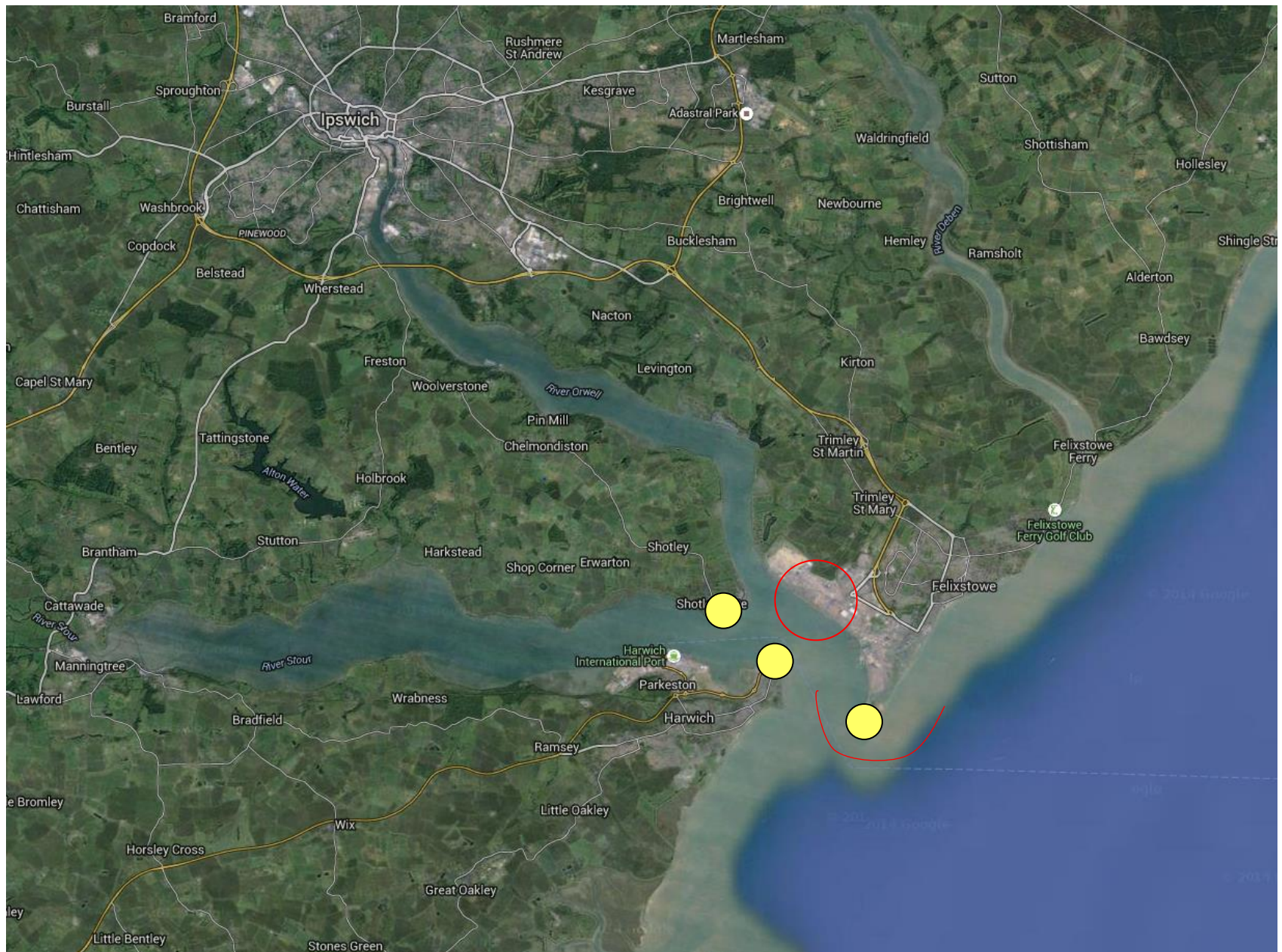






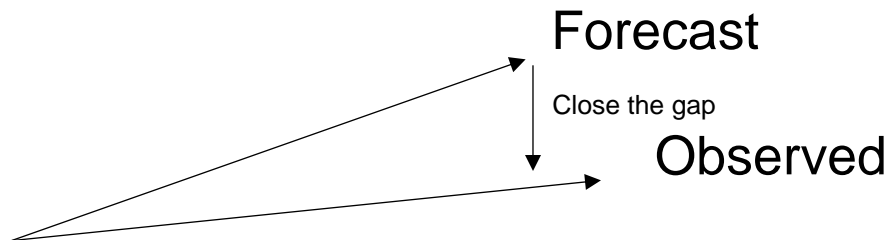






# Improving Forecast Accuracy...

...What can we do?





**Thank you for listening...**