

# The Shipping Forecast

wind power, weather models, and fuel savings

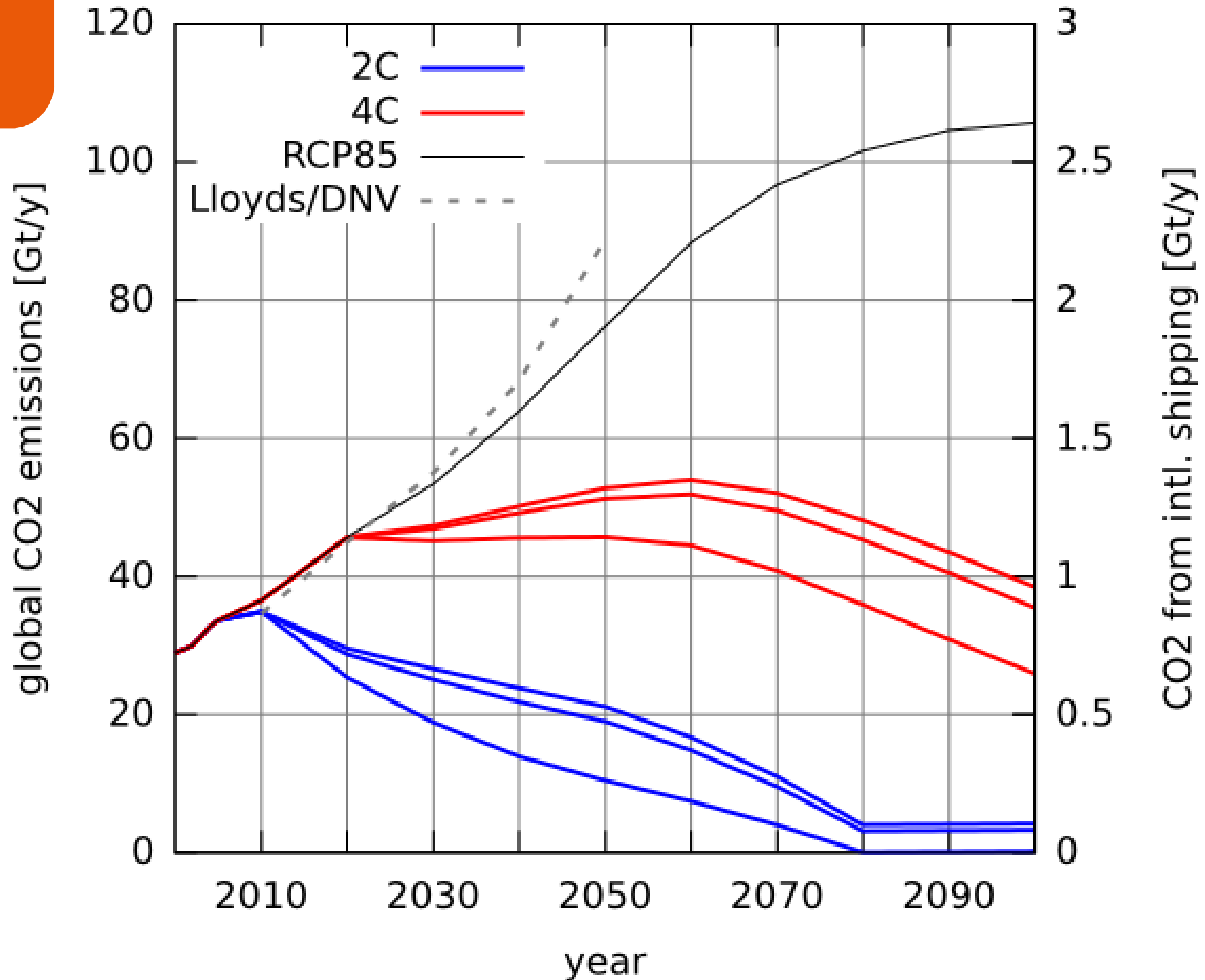


Michael Traut

## Overview

- 1. Powering the future**
- 2. The case for wind**
- 3. The Fleet Suite project – work in progress**
- 4. Environmental data: everything, everywhere?**
- 5. Conclusions and the way forward**

# 1. Powering the future



## 2. The case for wind

**zero emissions**

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**available on the oceans**

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**there is a long history of wind-powered shipping**





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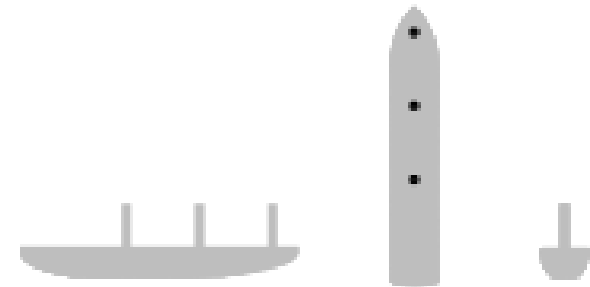
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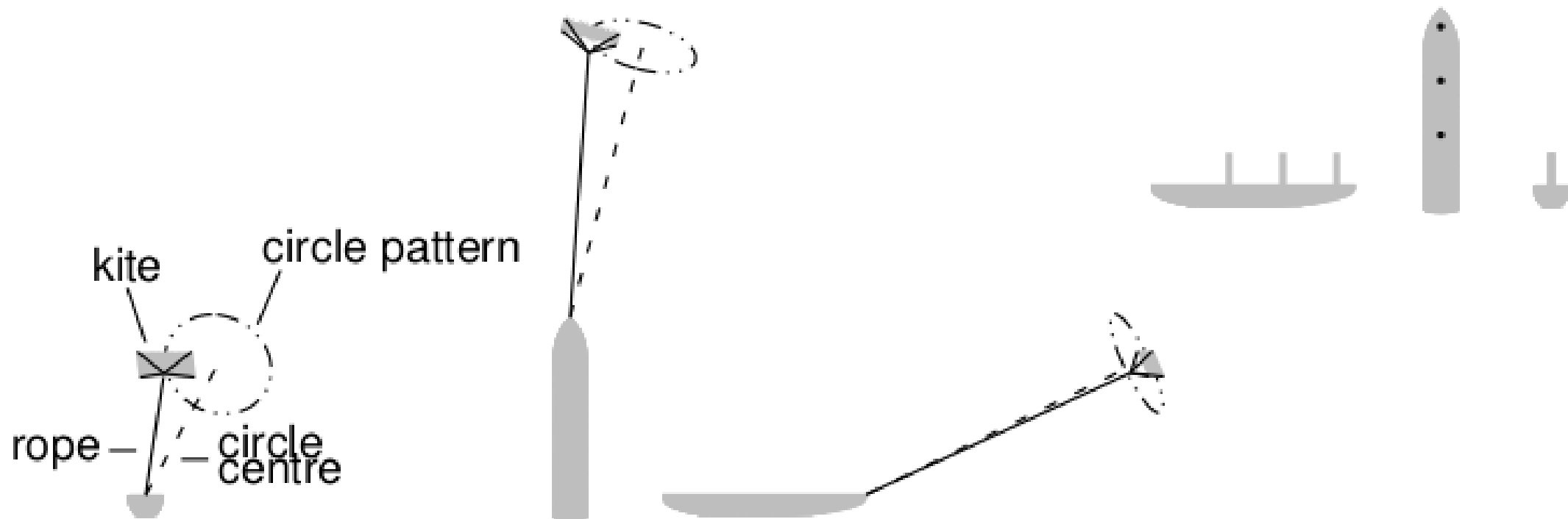


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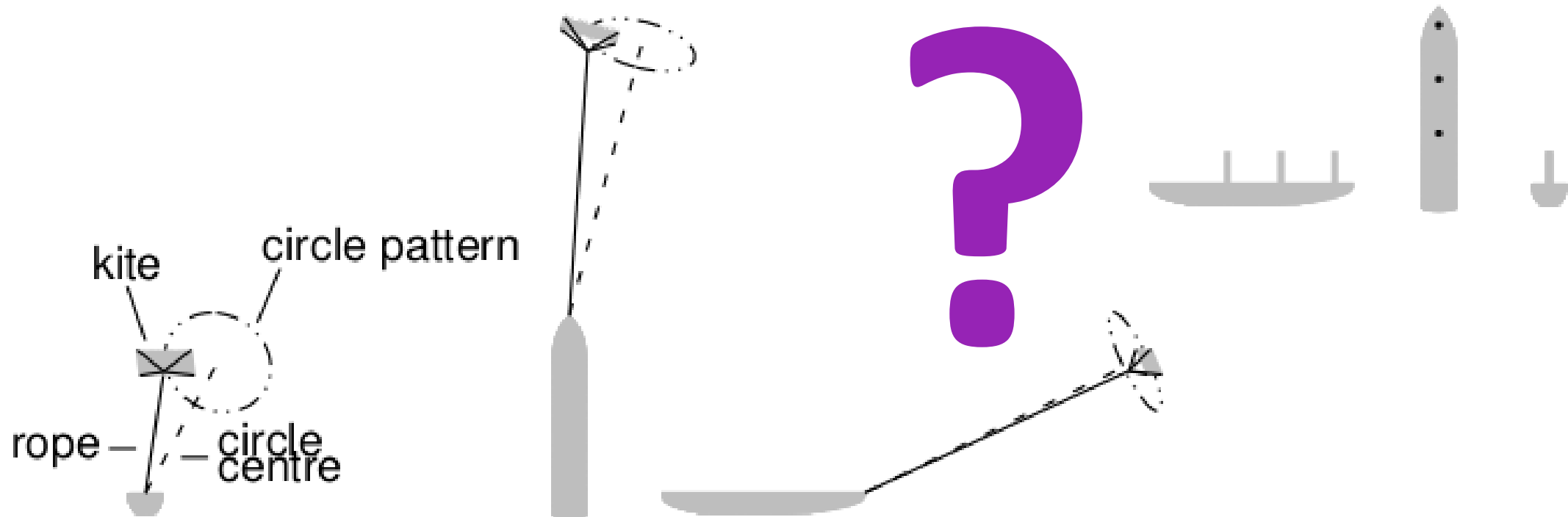


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### 3. The Fleet Suite project

**tracking ships**

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**understanding trade patterns**

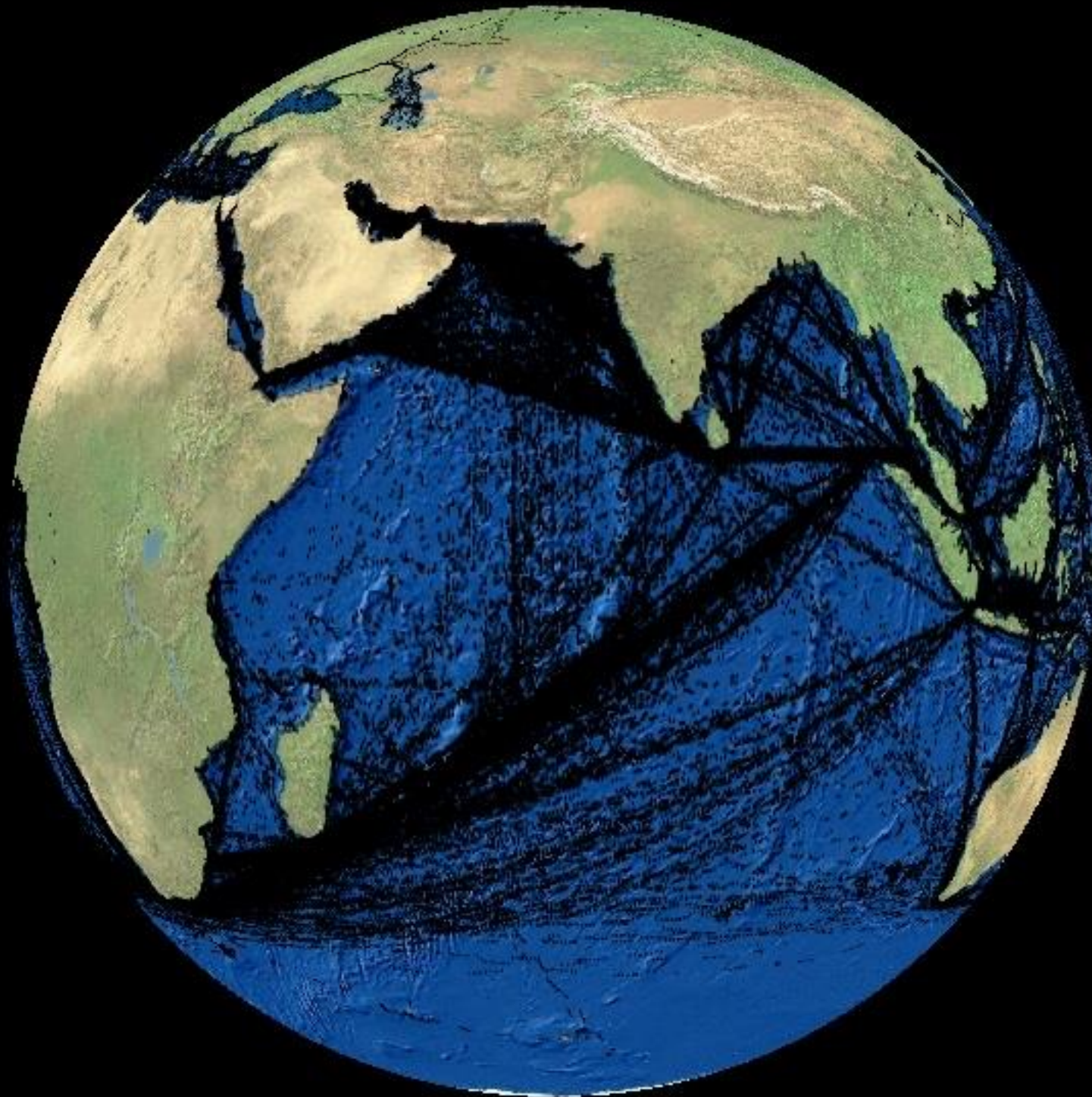
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**tracking ships**

**understanding trade patterns**

**a clear view of shipping emissions**

**focus on specific routes**

### 3. The Fleet Suite project



## 4. Environmental Data (1)

**Wind**

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**Waves**

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**Wind**

**Waves**

**Currents**

## 4. Environmental Data (2)

### Wind

#### 2 models:

1. **Unified Model (Met Office) analysis data 768 x 1024 cells. Height level 37m.**
2. **MERRA: Modern-Era Retrospective Analysis for Research and Applications (NASA) 540 x 360 reanalysis data. Height level 50m.**

#### 3 technology models:

1. **Flettner rotor**
2. **Towing kite**
3. **Fixed wing sail**

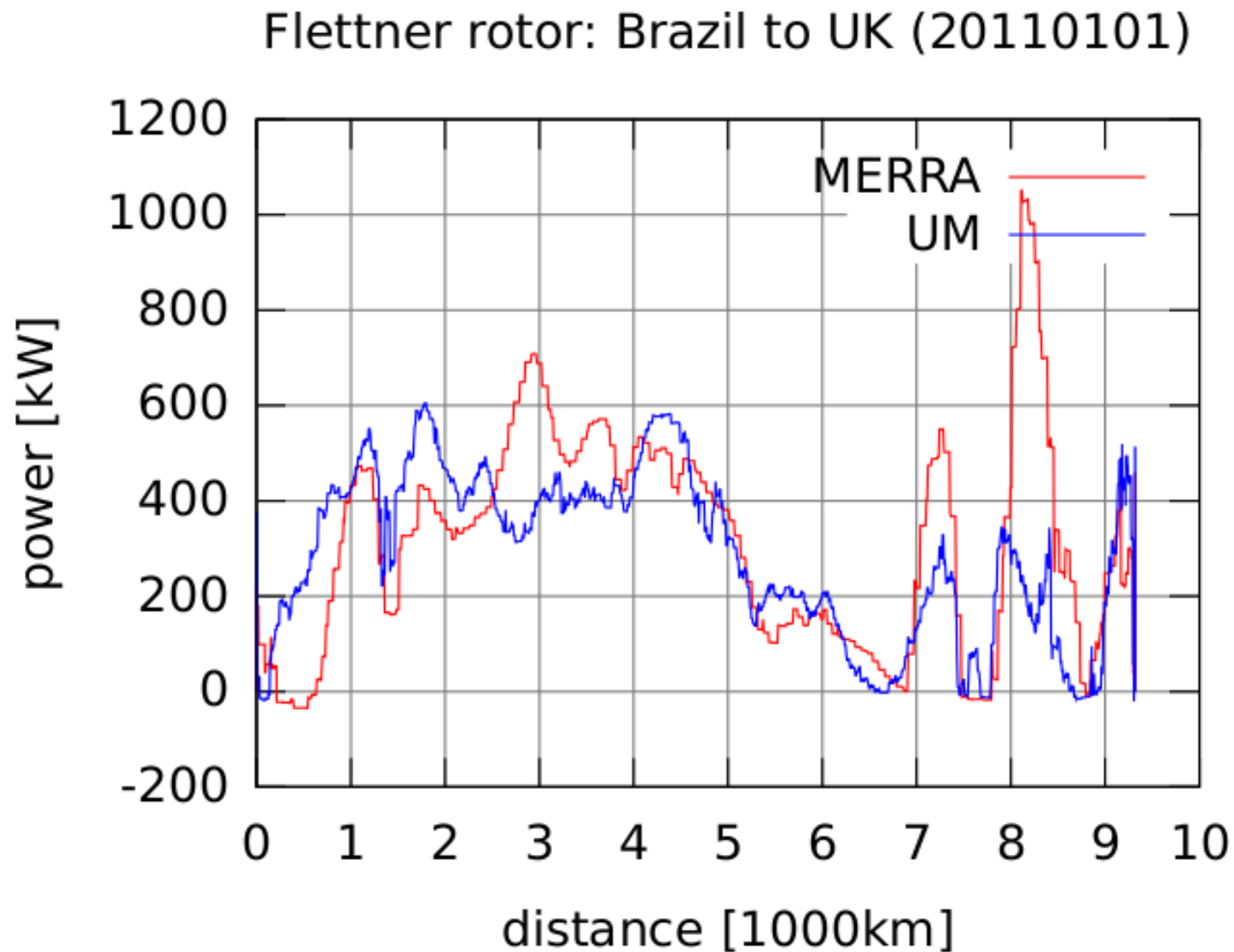
## 4. Environmental Data (3)

Aggregate results on sample route between Brazil and UK (13 dates):

	Flettner rotor	Towing kite	Fixed wing sail
<u>UM</u>	257kW	132kW	145kW
<u>MERRA</u>	283kW	161kW	113kW

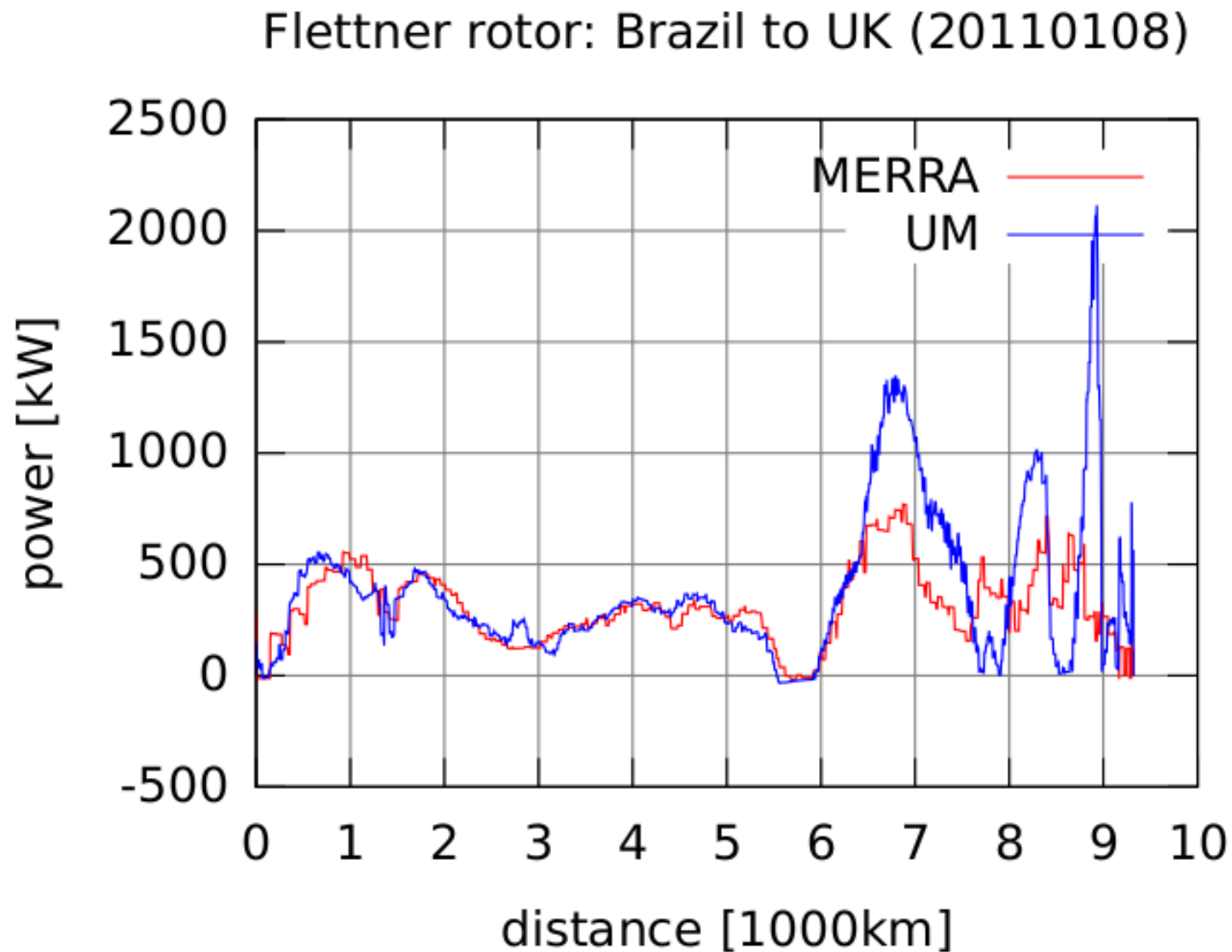
## 4. Environmental Data (4)

Power contribution along sample route between Brazil and UK, at specific dates:



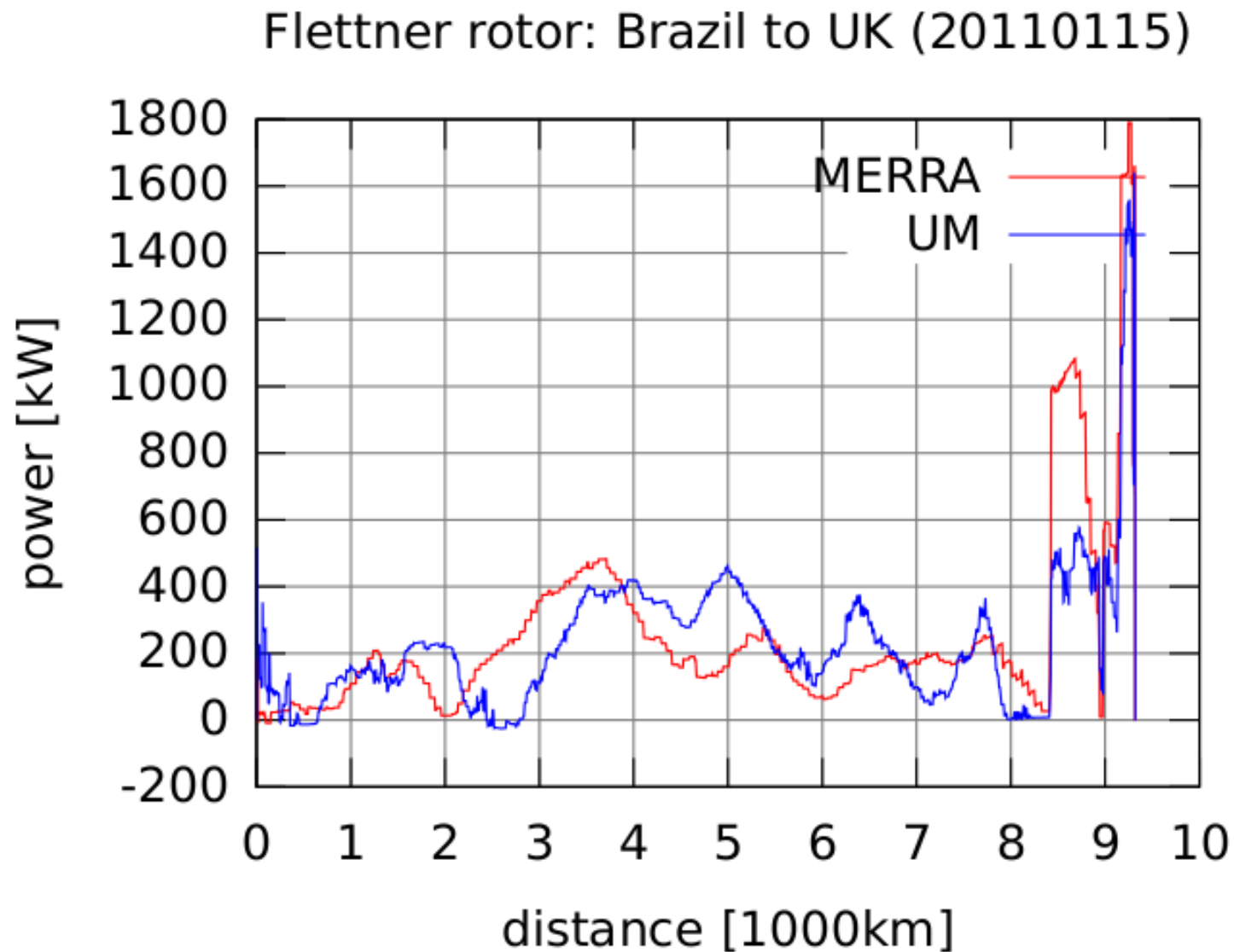
## 4. Environmental Data (4)

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Power contribution along sample route between Brazil and UK, at specific dates:



## 5. Conclusions (questions) and the way forward

On aggregate (averages along routes, over different times) – good agreement.

→ highlighting the potential for wind-powered shipping

But differences in individual results

→ moving to forecast data and optimisation?

→ changes in wind over time; and as a consequence of climate change?

Include waves; currents

Interaction with ship system

Technology details:

ship structure and mechanics

aero-performance

economics → relates back to wider picture of global shipping: ongoing process!

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THANK YOU!