



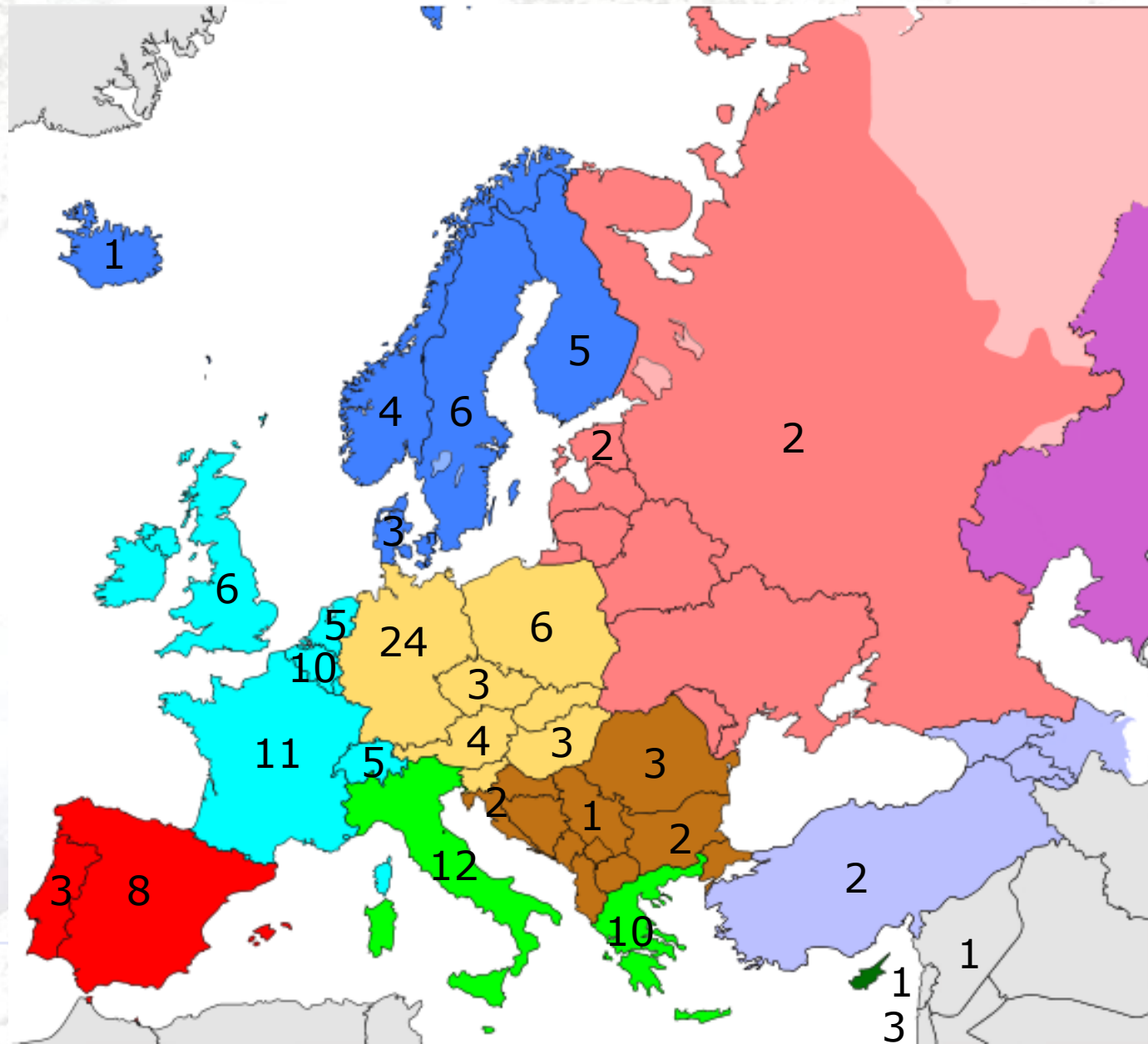
European Association of  
Remote Sensing Laboratories

A European Network

<http://www.earsel.org>



# EARSeL member laboratories



# What does it?

## ➤ Special Interest Groups

They

- organise **workshops and specialist meetings**
- produce Proceedings
- Prepare contracts and organise **projects**
- inform EARSeL members and bring together scientists in that specific field



# What does it?

## ➤ Special Interest Groups

- 3D Remote Sensing
- Coastal Zones
- Cultural and Natural Heritage
- Developing Countries
- Forestry
- Forest Fires
- Remote Sensing with UAV
- Geological Applications
- Imaging Spectroscopy
- Land Ice and Snow
- Land Use and Land Cover
- Radar
- Thermal Remote Sensing
- Urban Remote Sensing
- Education and Training





# What does the SIG Education & Training?

## ➤ Organising workshops

In 2014:

**1<sup>st</sup> Student Workshop on Optics of the White Sea**



3<sup>rd</sup> Student Workshop on Optics and Ecology of Coastal Zones  
Kaliningrad, Russia, 10 – 13 July 2017



# What does the SIG Education & Training?

## ➤ Organising workshops

19-23 July 2016: 2<sup>nd</sup> Student Workshop  
on Optics and Ecology of Coastal Zones



3<sup>rd</sup> Student Workshop on Optics and Ecology of Coastal Zones  
Kaliningrad, Russia, 10 – 13 July 2017





# What does the SIG Education & Training?

## ➤ Organising workshops

Today:

3<sup>rd</sup> Student Workshop



3<sup>rd</sup> Student Workshop on Optics and Ecology of Coastal Zones  
Kaliningrad, Russia, 10 – 13 July 2017



# What does the SIG Education & Training?

## ***3rd Student Workshop on Ecology and Optics of Coastal Zones***

### **Programme, status 9 July 2017**

**10 July 2017**

**Museum: Lobby**

10:00 - 11:00 **Student Workshop Registration**

**Museum: Lecture Hall**

Moderator: Svetlana Patsaeva

11:00 - 11:15 **Welcome and Opening**

11:15 - 12:00 **The ESA Earth Observation Programme (Keynote)**

Chris Stewart, Earth Observation Programmes, European Space Agency (ESA), Frascati, Italy

12:00 - 12:30 **Status and future trends of eLearning in natural science using remote sensing (Keynote)**

Rainer Reuter, OpticSense GmbH, Oldenburg, Germany

12:30 - 13:00 **Scientific-research vessels designed to provide space programmes of the USSR**

Vladimir Proschenko, Space Research Division of Marine Expeditionary Work (USSR Academy of Sciences), St. Petersburg, Russia

13:00 - 14:30 **Lunch**



3<sup>rd</sup> Student Workshop on Optics and Ecology of Coastal Zones  
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# What does the SIG Education & Training?

## **Museum: Lecture Hall**

Moderator: Sergey Dolenko

14:30 - 18:30 **Lectures and practical exercises**

14:00 - 14:30 **Practice of UV lidar application to the total suspended sediments evaluation in the near-surface waters**

Vadim Pelevin, P.P. Shirshov Institute of Oceanology, Moscow, Russia

14:30 - 15:00 **Standardized biotest methods for water quality ecological assessment**

Vera Terekhova, Faculty of Soil Sciences, Lomonosov Moscow State University, and A.N. Severtsov Institute of Ecology and Evolution, Russian Academy of Sciences, Moscow, Russia

15:00 - 17:00 **Satellite data processing using ESA OS Software Toolbox (SNAP), with a focus on coastal applications (Practical exercises)**

(Participants use their own laptops, SNAP software shall be installed in advance from <http://step.esa.int/main/download/> with option 'All Toolboxes')

Chris Stewart, Earth Observation Programmes, European Space Agency (ESA), Frascati, Italy

16:00 - 16:15 Coffee

17:00 - 17:30 **Not the sea and not a lake: meromictic water bodies separating from the sea**

Elena Krasnova, White Sea Biological Station, Lomonosov Moscow State University, Russia

17:30 - 18:00 **Three polar stars: Roald Amundsen, Robert Peary, Ernest Shackleton**

Anatoliy Pantyulin, Faculty of Geography, Lomonosov Moscow State University, Russia

## **Museum: R/V Vityaz**

19:00 - 21:00 **Welcome Party**



# What does the SIG Education & Training?

## ➤ Initiating projects

**2007-10: SEOS: Science Education through Earth Observation for High Schools**

University

Copernicus

Interested public

High school

advanced courses

Secondary school

High school, basic courses

Internet-based  
eLearning tutorials:

[www.seos-project.eu](http://www.seos-project.eu)

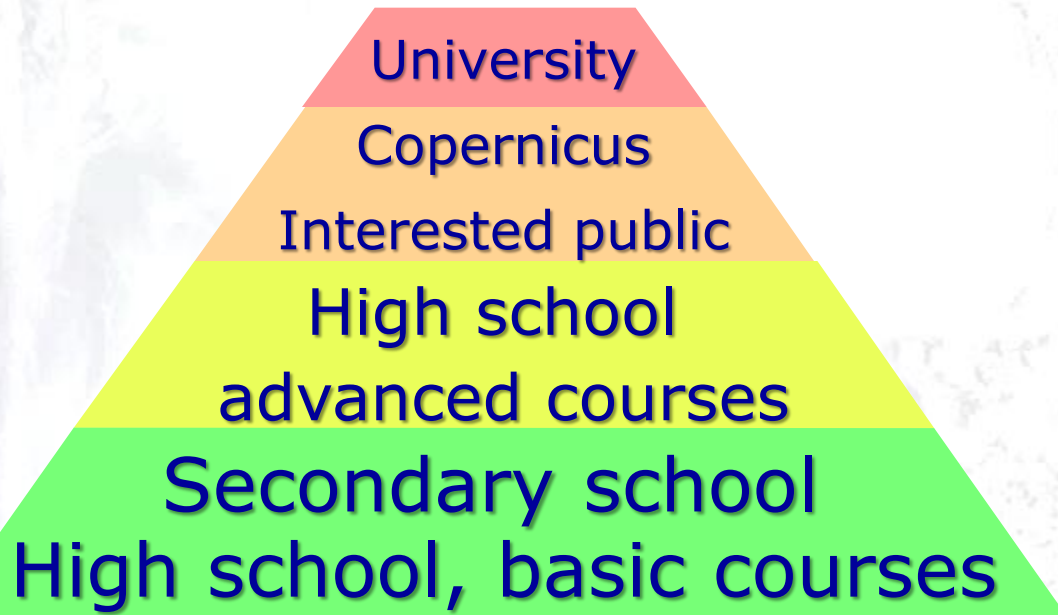




# What does the SIG Education & Training?

## ➤ Initiating projects

Which project will be next?







European Association of  
Remote Sensing Laboratories

**We wish you  
a pleasant  
workshop!**





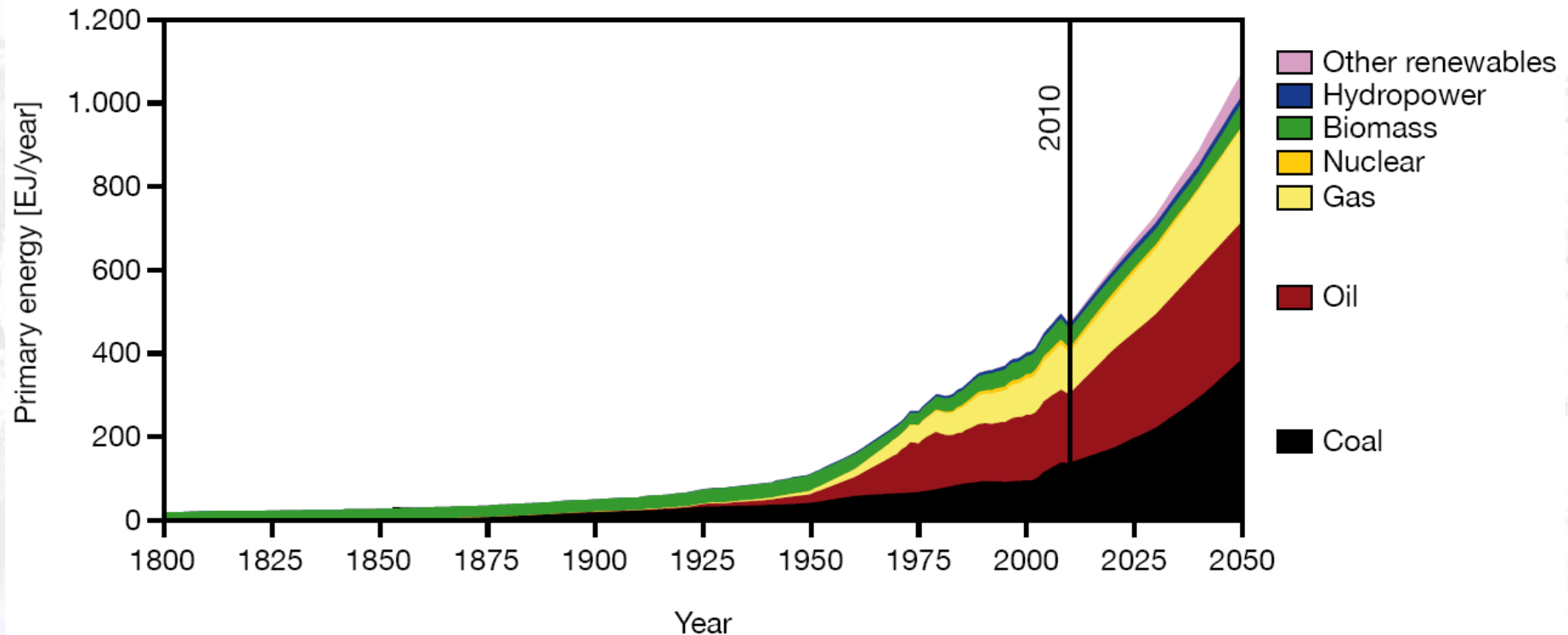
# What could be the future activity?

A suggested key topic: **Energy & Climate**





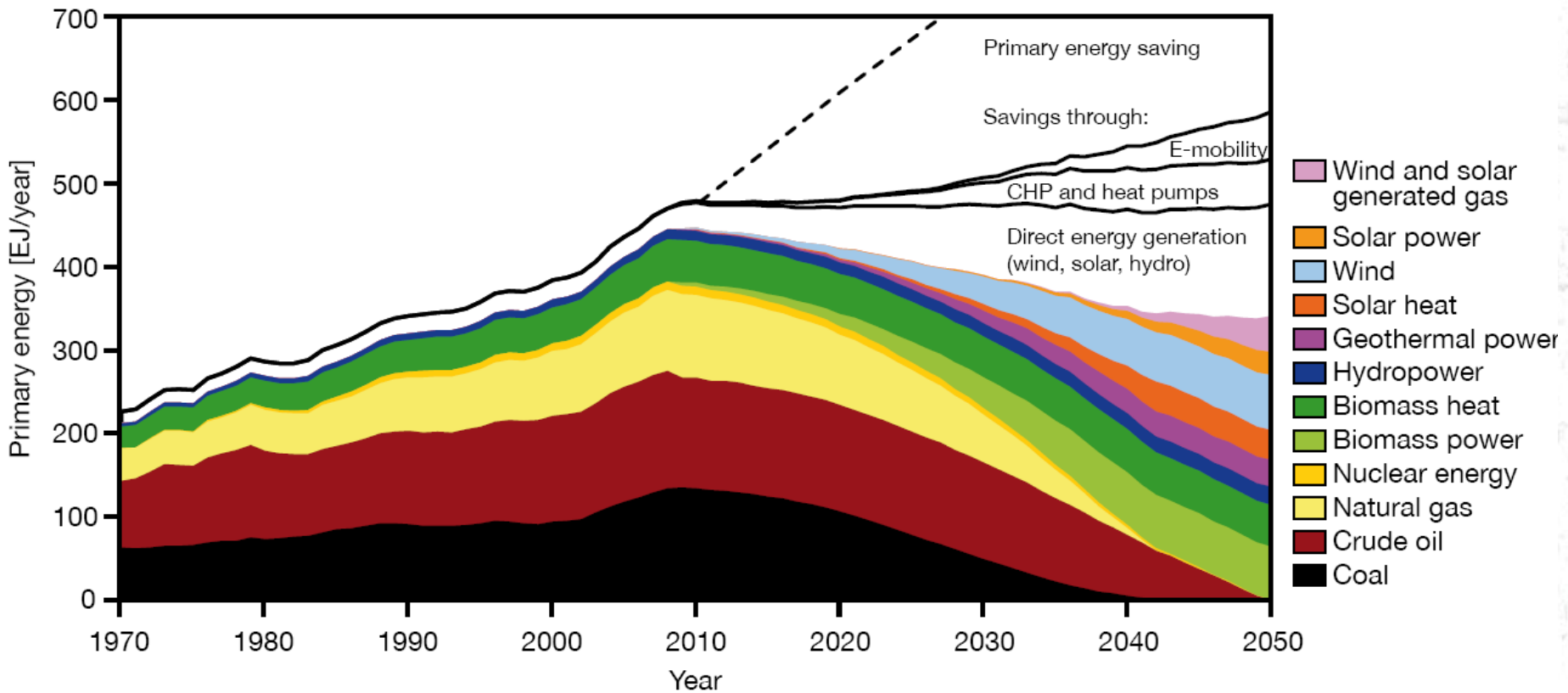
# Global primary energy demand, 1800-2050, business as usual



Source: German Advisory Council on Global Change, Flagship Report 2011, p. 54  
<http://www.wbgu.de/en/flagship-reports/fr-2011-a-social-contract/>



# Vision for a global renewable energy supply by 2050



Source: German Advisory Council on Global Change, Flagship Report 2011, p. 121  
<http://www.wbgu.de/en/flagship-reports/fr-2011-a-social-contract/>



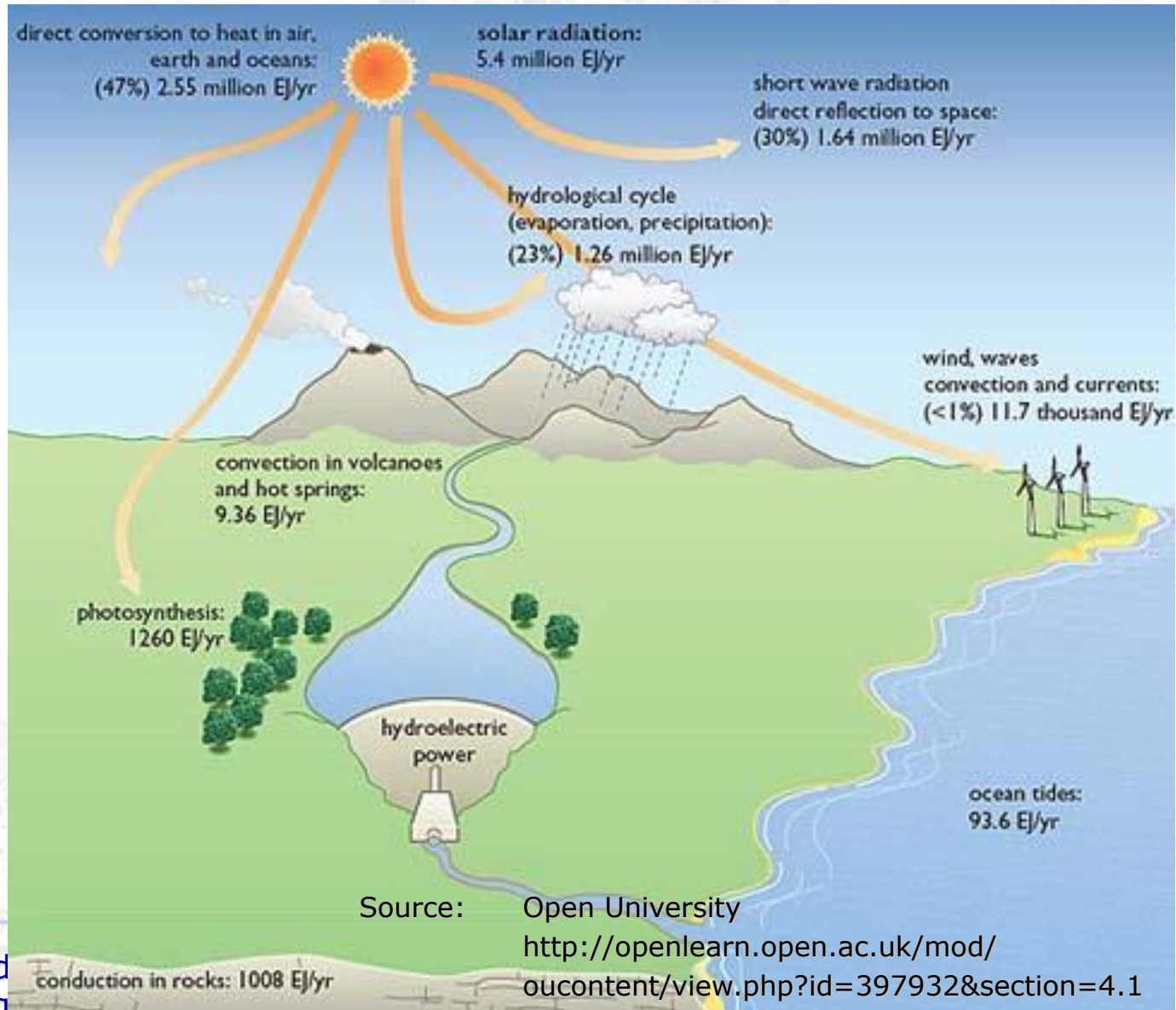


# Renewable energies are fluxes

Incoming:  
 $5.4 \cdot 10^6$  EJ/year

Demand today:  
500 EJ/year

Exajoule (EJ):  $10^{18}$  J



# Renewable Energies: global potentials

	<b>Theoretical Potential EJ/year</b>	<b>Technical Potential EJ/year</b>	<b>Sustainable Potential EJ/year</b>	<b>Production 2008 EJ</b>
Biomass	2,400	800	100	50.3
Geothermal	41,700,000	720	22	0.4
Hydropower	504,000	160	12	11,6
Solar Energy	3,900,000	280,000	10,000	0.5
Wind Energy	110,000	1,700	>1,000	0.8
<b>Total</b>	<b>46,000,000</b>	<b>283,500</b>	<b>&gt;11,000</b>	<b>64</b>

Global energy demand in 2008: 492

Source: German Advisory Council on Global Change, Flagship Report 2011, p. 119  
<http://www.wbgu.de/en/flagship-reports/fr-2011-a-social-contract/>





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# How much solar and wind energy will be sustainable?

## ➤ Solar energy

Incoming:

$\sim 250 \text{ W/m}^2$

Conversion efficiency:

$> 15 \%$

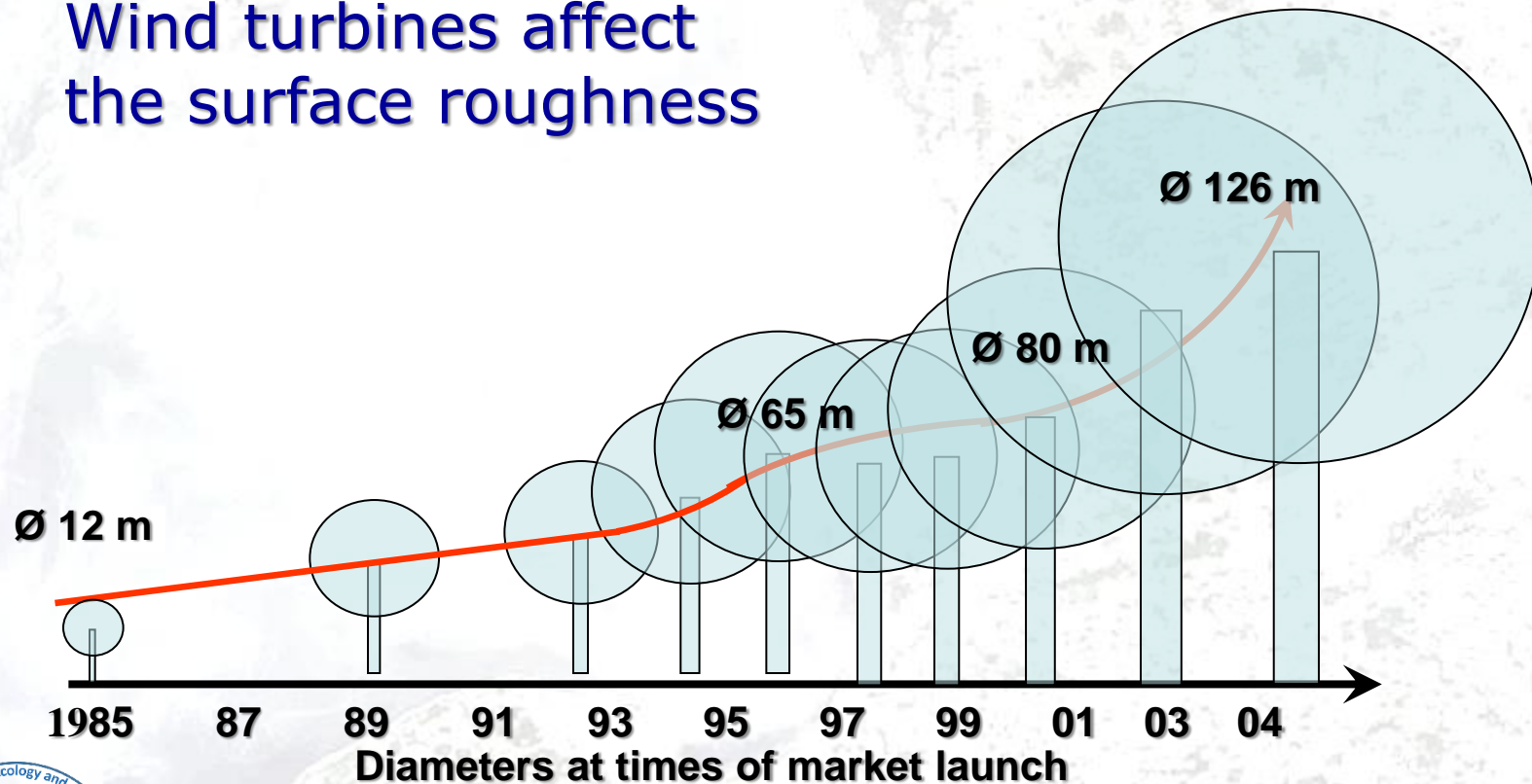
Locally used for electricity:  $40 \text{ W/m}^2$

?

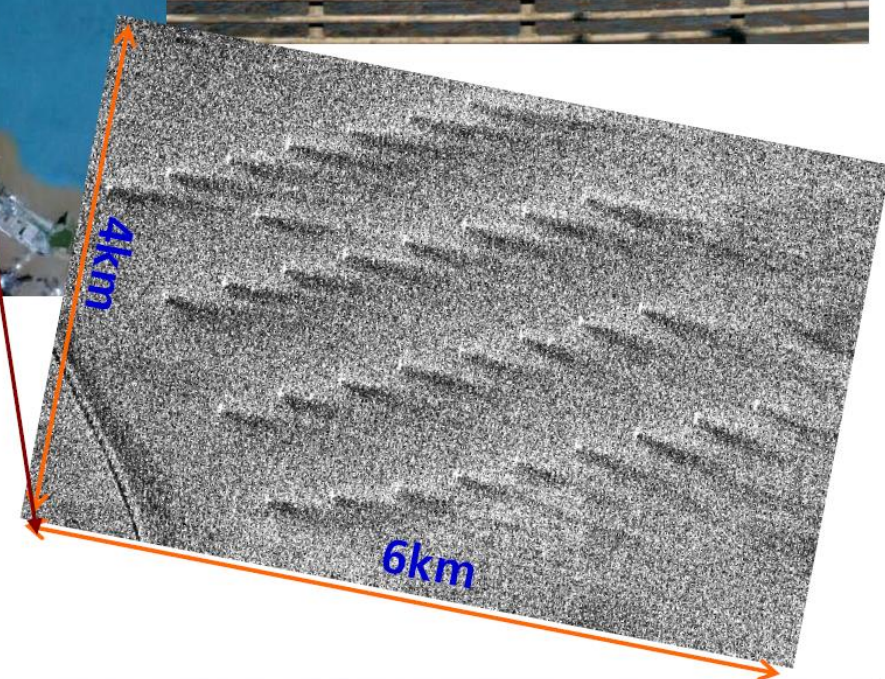
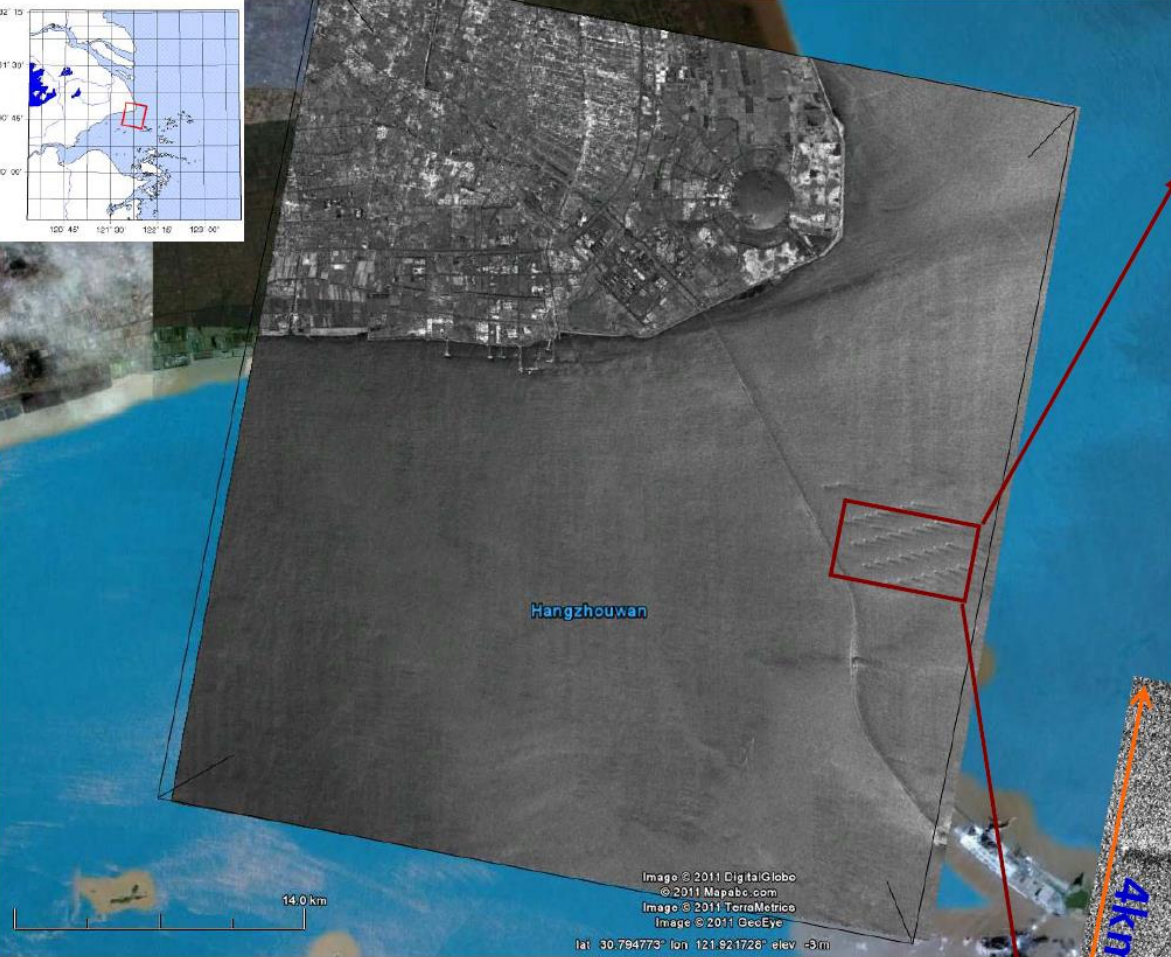
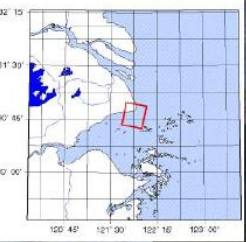


# How much solar and wind energy will be sustainable?

- **Wind energy**  
Wind turbines affect the surface roughness



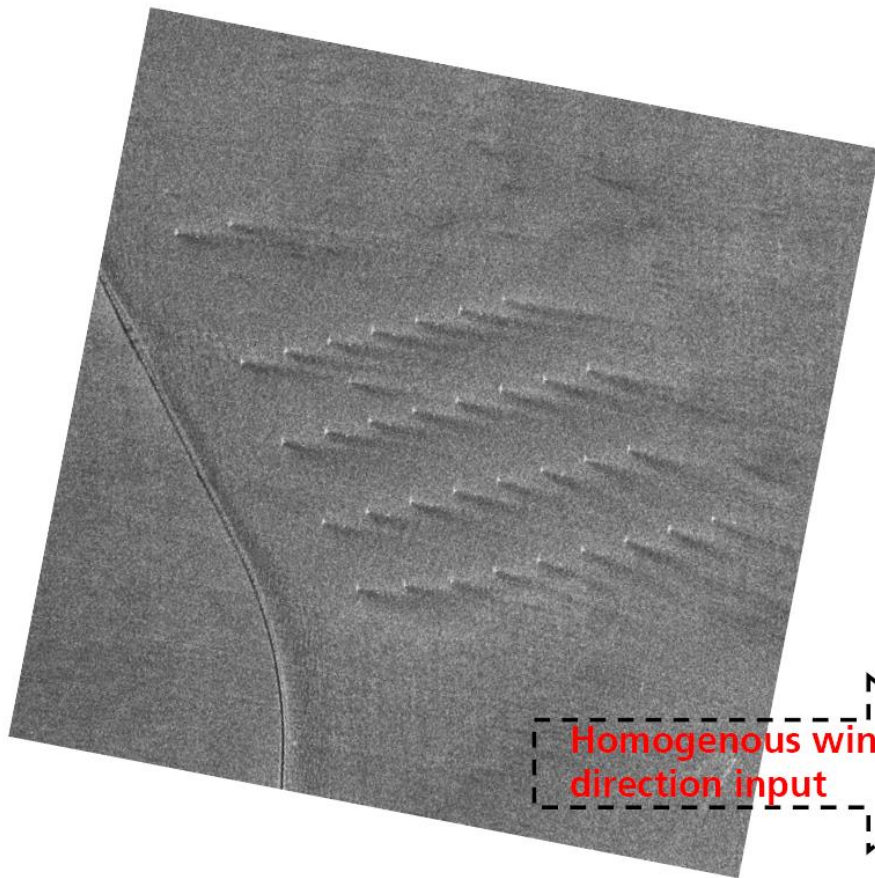




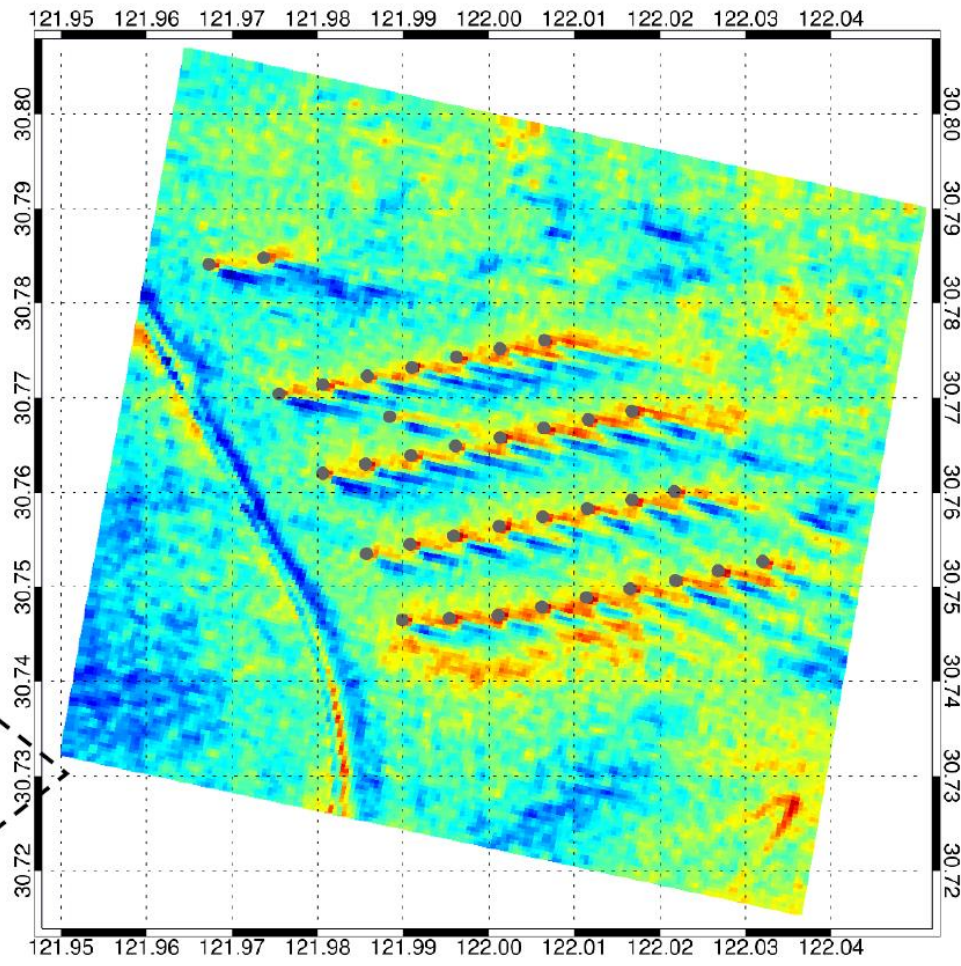
TS-X Stripmap data  
 acquired on Feb.08, 2011 at 22:02 UTC;  
 HH polarisation  
 Pixel Size: 1.25 m  
 Resolution: 3 m.



# Sea Surface Wind Speed over Wind Farming Park



Homogenous wind direction input



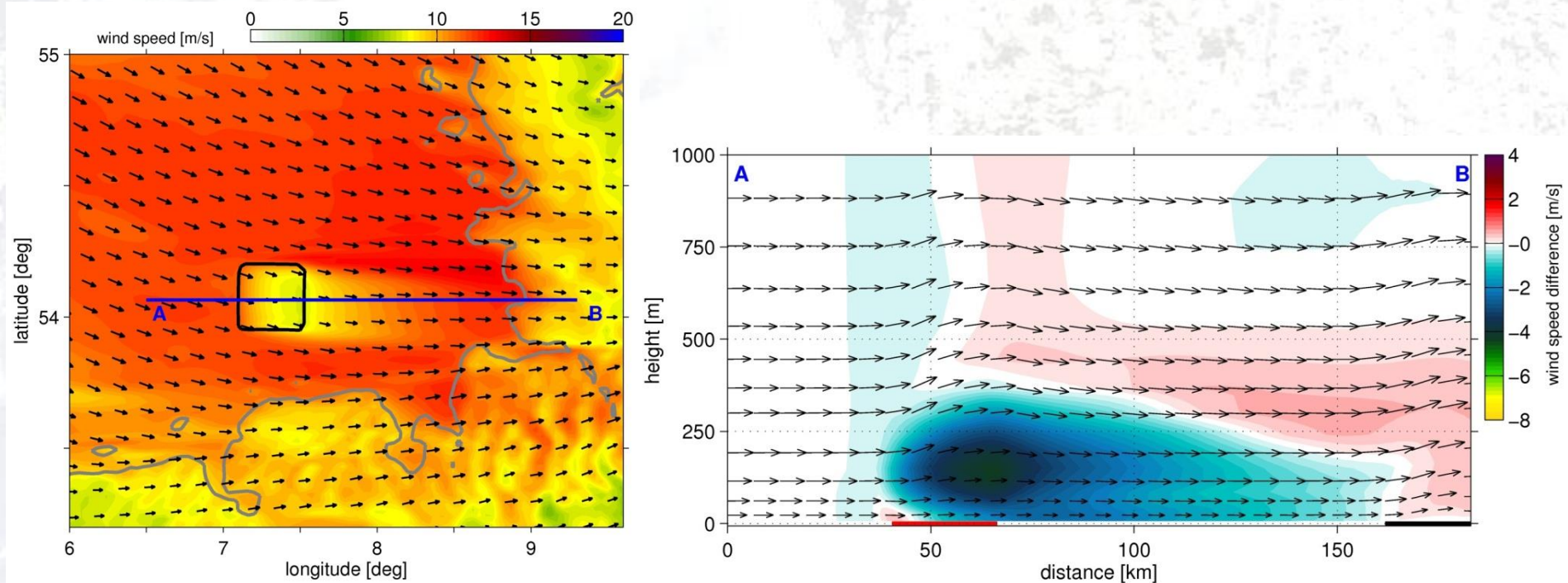
Box\_size: 100 m  
Step\_size: 50 m





# How much solar and wind energy will be sustainable?

## ➤ Wind energy



Wind farm 28 x 28 km<sup>2</sup>, 6 GW, 1200 turbines

Courtesy:

Elisabeth Stütz, ForWind, University of Oldenburg

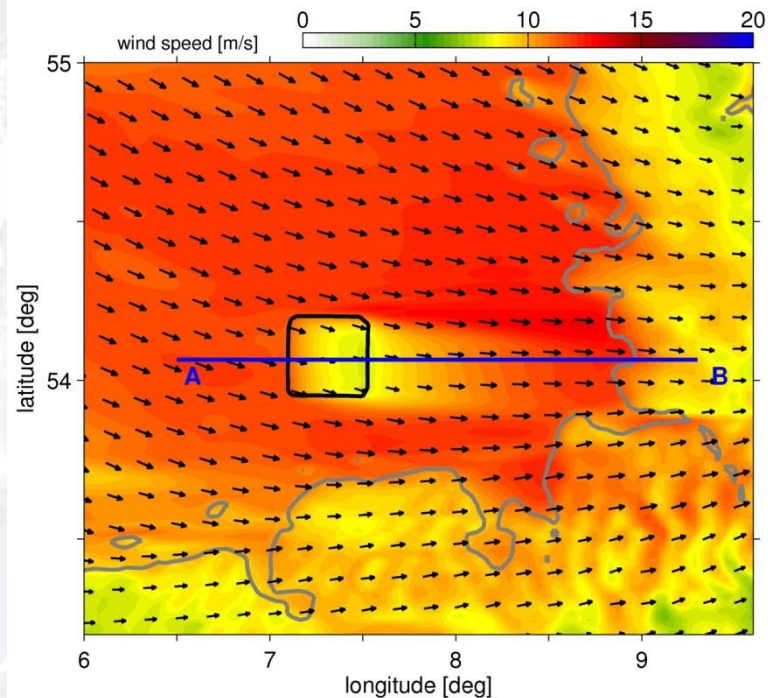


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# How much solar and wind energy will be sustainable?

## ➤ Wind energy



DEWI MAGAZIN NO. 37, AUGUST 2010

Courtesy:

Elisabeth Stütz, ForWind, University of Oldenburg

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# Where should EARSeL go?

- **Climate and Energy: Key topics for RS**
  1. Protection of the environment and its resources
  2. Less energy poverty in developing countries
  3. Promotion of peace by reducing the dependence on regionally concentrated energy resources
  4. Estimate of benefit / risk for the future climate

