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Exeter, 6 October 2016

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

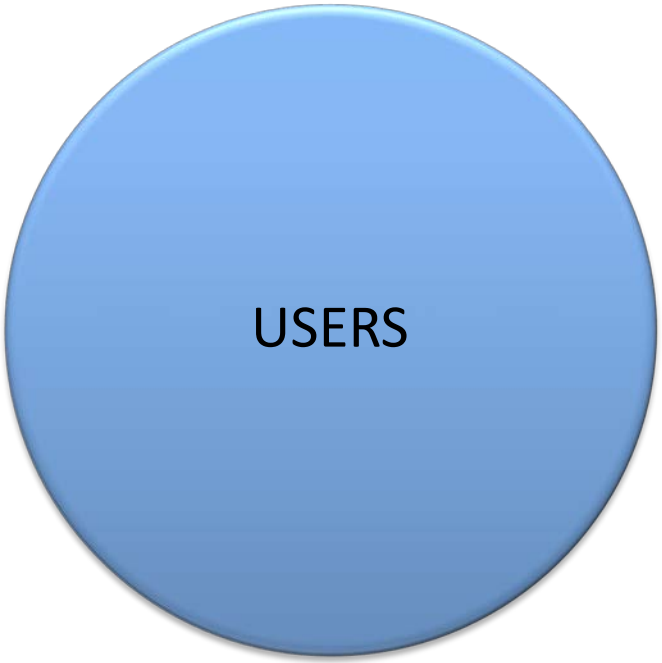
EXCELENCIA SEVERO OCHOA

CLIMATE SERVICES:
The added value of communication and social science

Isadora Ch. Jiménez
Earth Sciences Department, Earth System Services Group

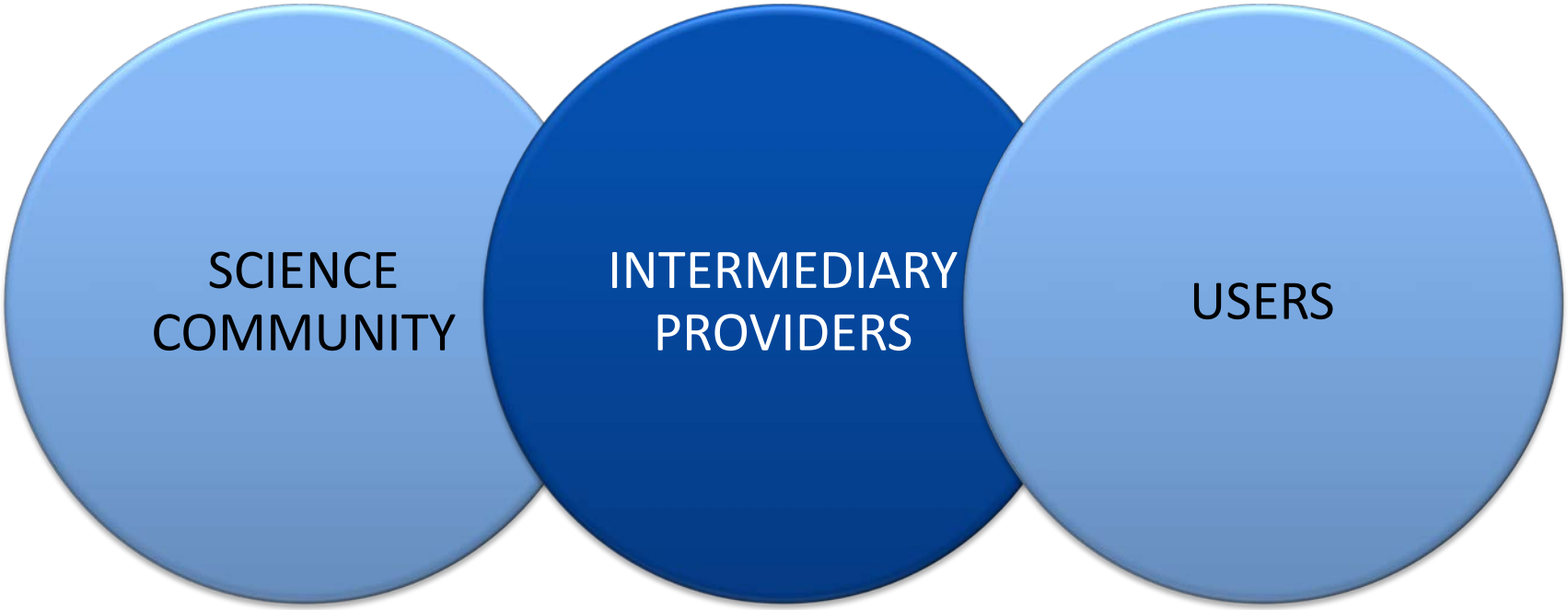
Climate services

- Climate modeling
- Climate observations



- Policy-makers
- Public sectors
- Business sectors

Climate services



- Climate modeling
- Climate observations

- Research community in climate services
- Emerging market in climate services

- Policy-makers
- Public sectors
- Business sectors

From Climate science to Climate services

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CLIMATE SERVICE ADDED VALUE

RESEARCH ADDED VALUE

CLIMATE SCIENCE

- Observations
- Climate predictions
- Climate projections
- Climate variables

SPECS
Seasonal-to-decadal climate Prediction for the improvement of European Climate Services

- Bias adjustments
- Skill and Reliability
- Climate indices
- Impact models

EUPORIAS

- **User-defined information**
- **User Interface Platforms**
- **Knowledge transfer**
- **Performance assessment**

Data → **Information** → **Knowledge**

Profiling a climate services team

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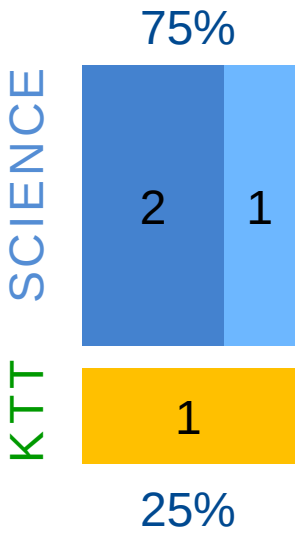
Data → **Information** → **Knowledge**

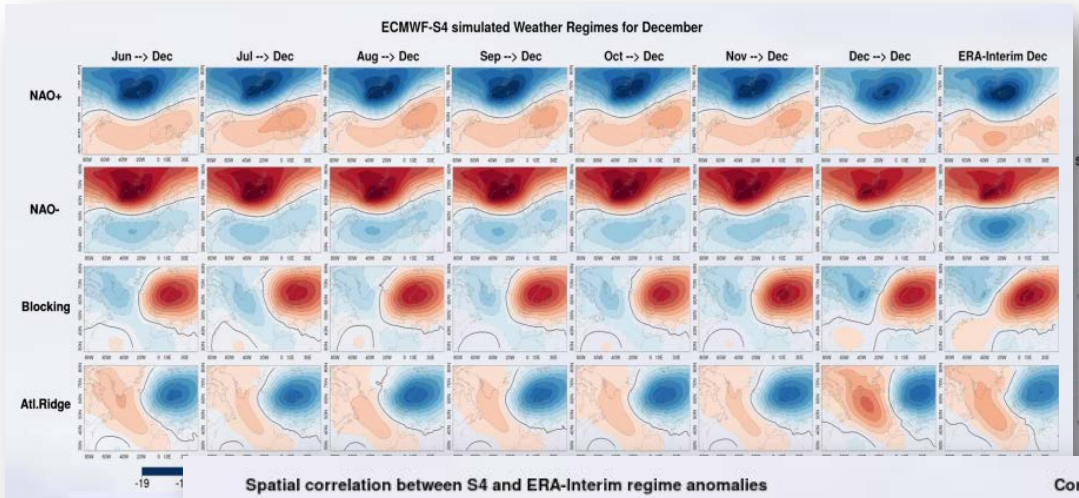


- Face-to-face meetings
- Sector conferences
- Present climate predictions and understand user's doubts
- Climate services research community interaction

PhD | Post-Doc

Manager

Climate Data



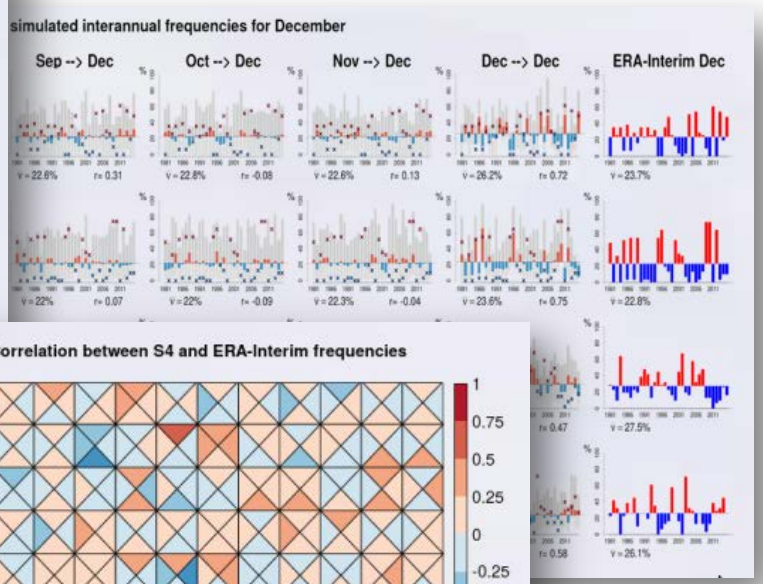


Figure 1. S4 si
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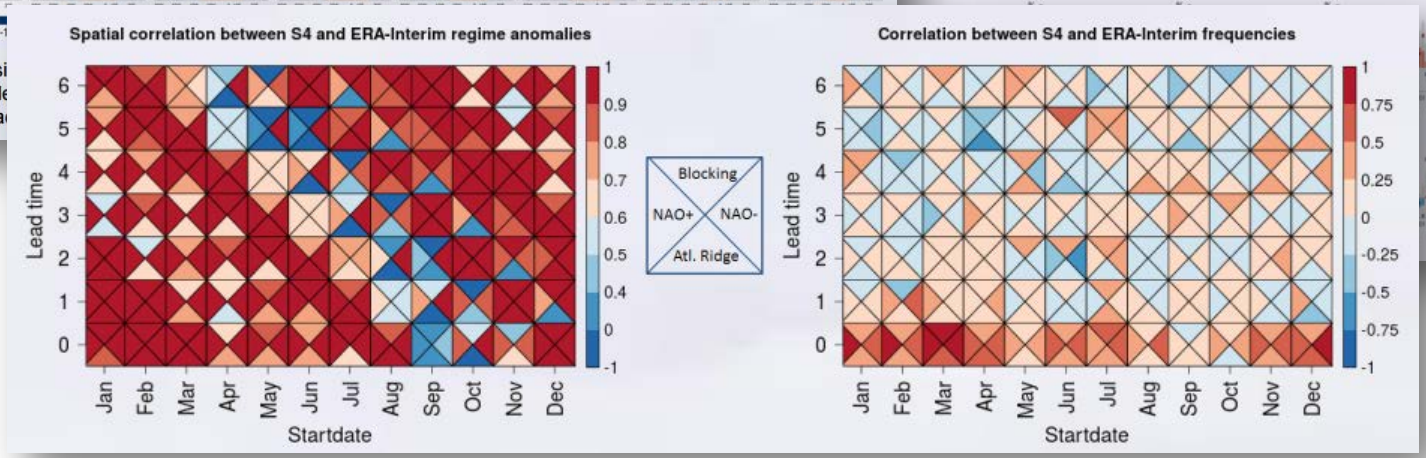

Cortesi et al. Weather regimes as a tool to validate seasonal forecasts (in prep)

Profiling a climate services team

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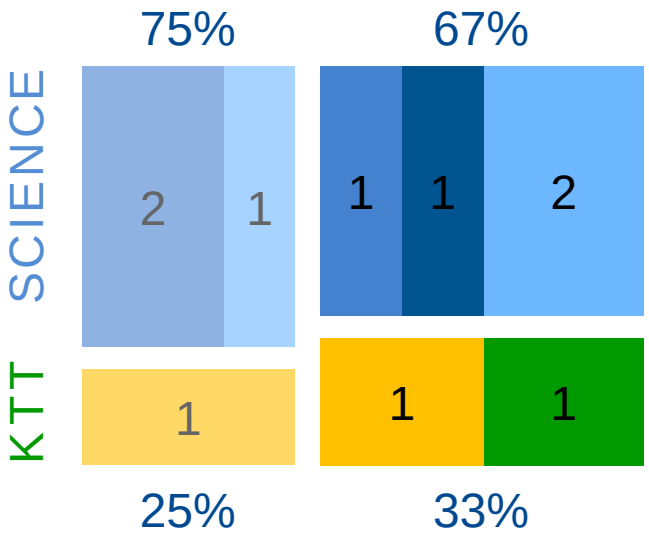
Data → **Information** → **Knowledge**



- Find the gaps in user understanding
- Improve/translate scientific explanations to user-specific vocabulary
- Communication material (fact sheets, outlooks)
- All types of dissemination and user-engagement material (leaflets, videos, multimedia…)

PhD	Post-Doc	Technical expert	Manager	Communication specialist

Climate information

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ASSESSMENT REPORT 1: Dec–Jan–Feb 2009, US

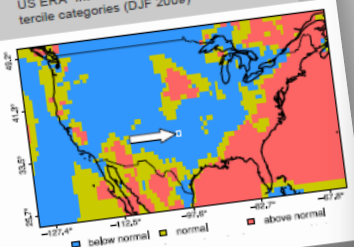
Key event characterisation

Description

STAKEHOLDER: EDPR
AREA: US
COORDINATES: 34.8º–35.5ºN 260.9º–261.6ºE
SEASON: December–January–February (DJF)
YEAR: 2009/10

a

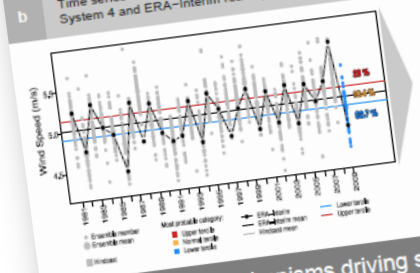
US ERA–Interim 10m wind speed tercile categories (DJF 2009)



RESILIENCE seasonal wind speed prediction

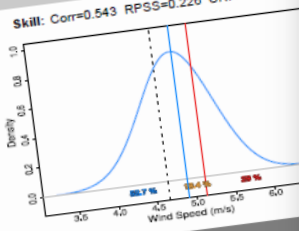
b

Time series of 10–m wind speed calibrated from ECMWF System 4 and ERA–Interim reanalysis (DJF 1981–2009)



Skill assessment and probability density function (DJF 2009 prediction)

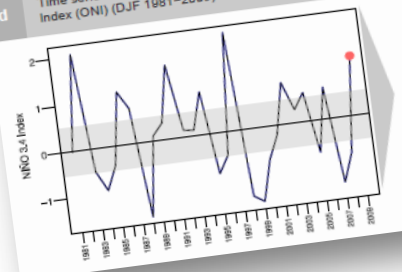
Skill: Corr=0.543 RPSS=0.226 CRPSS=0.115



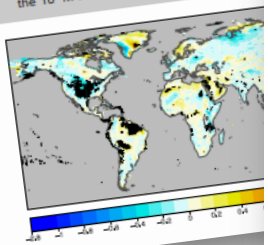
Mechanisms driving seasonal wind speed variability

d

Time series of the Oceanic Niño 3.4 Index (ONI) (DJF 1981–2009)



Impact of the positive phase of Niño 3.4 on the 10–m wind speed (DJF 1981–2014)



Climate services factsheet 3

Seasonal wind predi
ly or more windy tha
need to be tailored t

How do we tailor se

Seasonal wind speed predictions

Prediction bias correction

Prediction quality assessment

Climate services for the wind energy sector

Applications

- Mid-term
- Energy trad
- Estimation
- Meet the ba

Climate services factsheet 7

Use of climate information in the wind stakeholder chain

The high penetration of wind power in the electricity system provides many challenges mainly due to the unpredictability and variability of wind power generation. Therefore, having accurate forecasts of wind power is becoming increasingly important for many stakeholders in the wind energy sector.

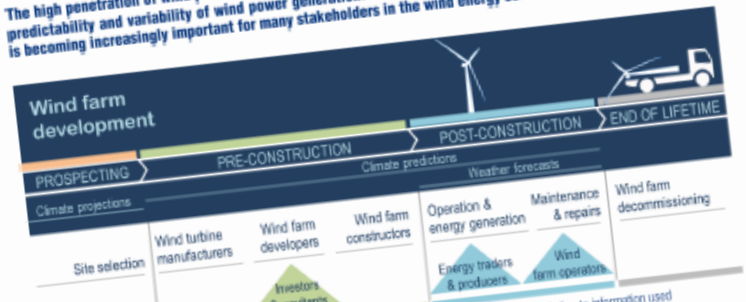


Figure 1: Stages of wind farm development, stakeholders involved at each stage and temporal horizons of climate information used

Prospecting

- **Climate projections** can be used for site selection according to the predicted wind conditions in a particular location in future decades.

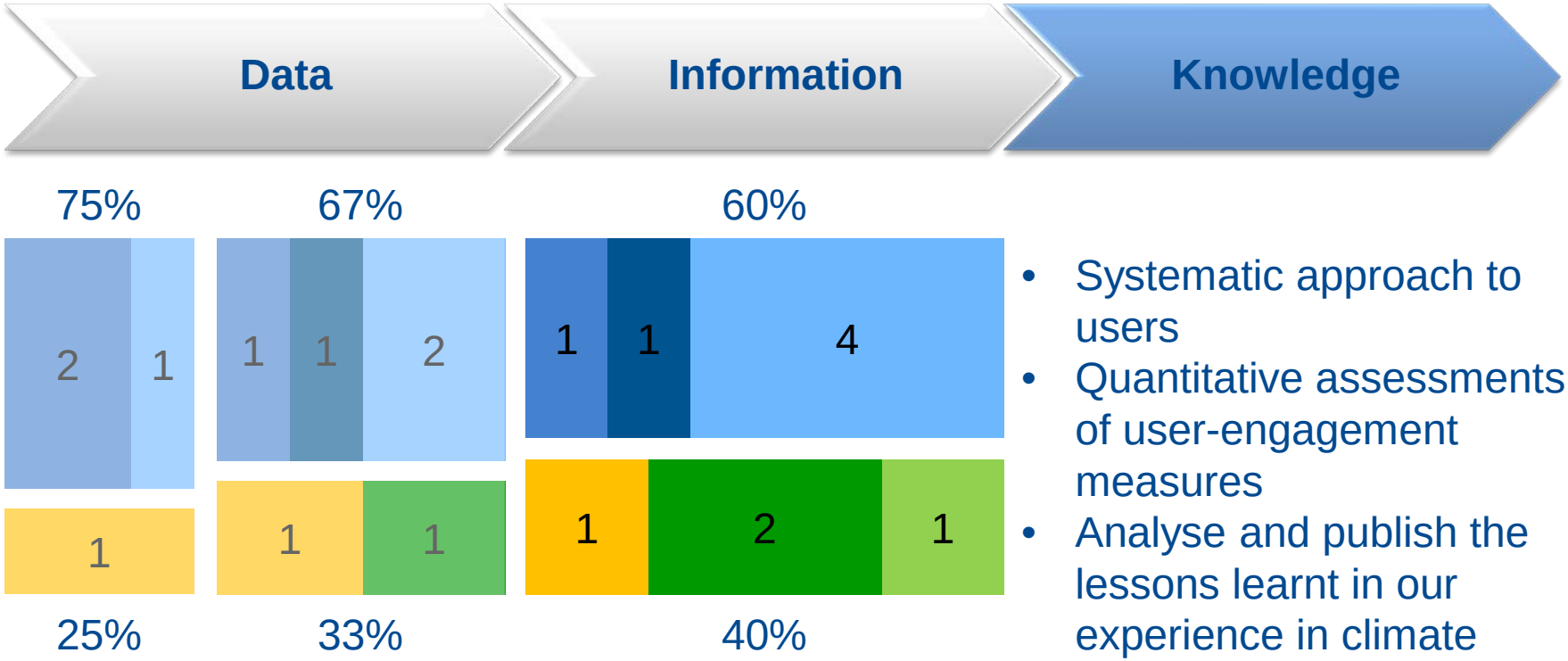
Pre-construction

- **Climate predictions from years to decades** can be relevant to understand and quantify the wind resource. For example, they can inform wind energy investors about the volatility of the resource in the future and how this risk can have an impact on the return on investment.

Post-construction

- **Weather forecasts below 6h** are useful to predict sudden events like ramps that can be managed by turbine and farm control.
- **Weather forecasts from 6h to 2-3 days** are used by transmission system operators for power system management (scheduling reserves, planning, congestion management). Wind farm operators use day-ahead & intraday forecasts for trading in the energy market.
- **Weather forecasts from 2-3 days up to a week** are used for operation & maintenance planning of wind farms, conventional power plants and transmission lines.
- **Climate predictions from sub-seasons to seasons** are particularly interesting to support offshore wind farm servicing logistics and onshore operation and energy generation.
- **Climate predictions from seasons to decades** are relevant to understand and quantify the wind resource, i.e. inform wind energy investors about the volatility of the resource in the future and how this risk can have an impact on the return on investment.

Profiling a climate services team

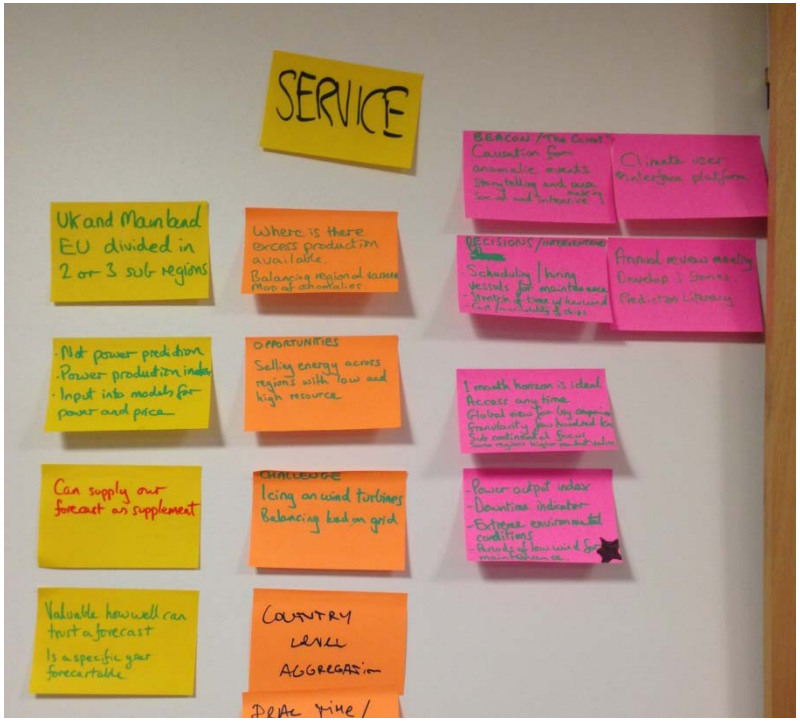


- Systematic approach to users
- Quantitative assessments of user-engagement measures
- Analyse and publish the lessons learnt in our experience in climate services.

PhD | Post-Doc | Technical expert | Manager | Communication specialist | Social scientist

Climate knowledge

User engagement practices (workshops, focus groups, interviews, surveys



Reaching users in Innovative ways

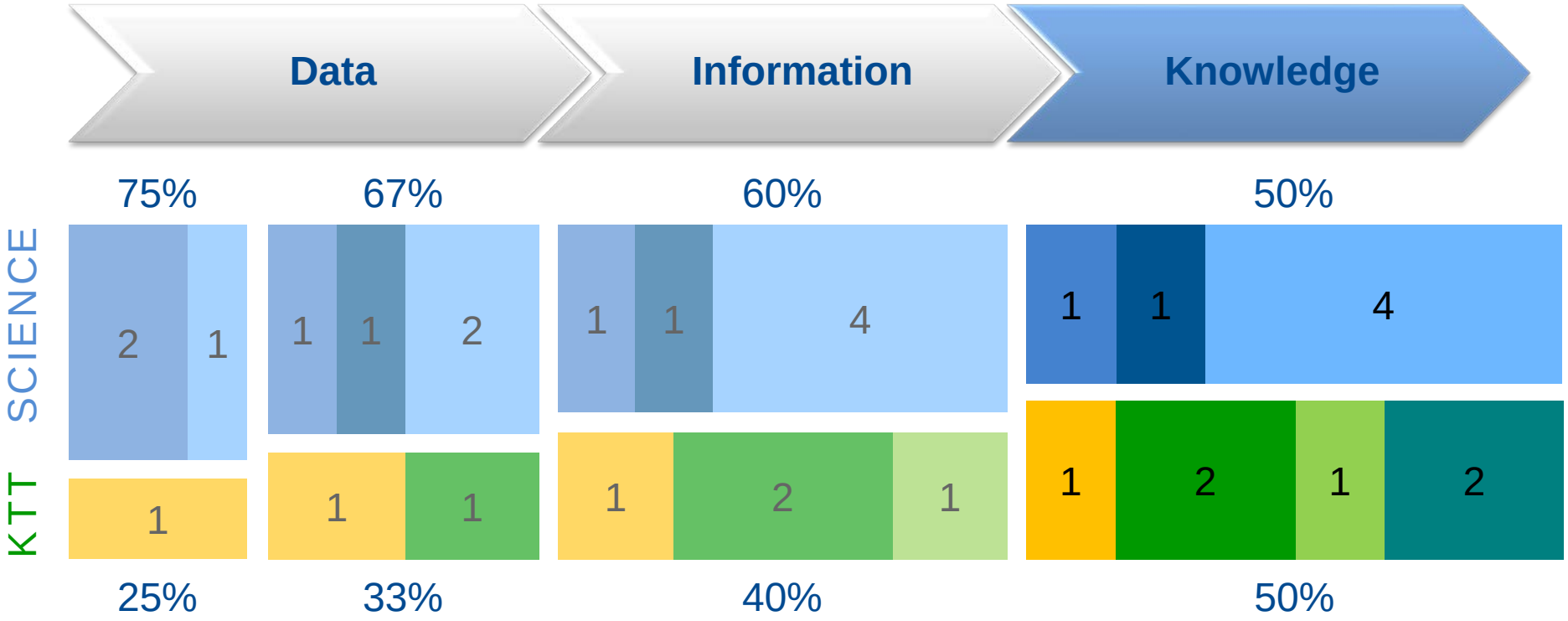
Weather roulette app

Climate knowledge

www.project-ukko.net

www.seasonalhurricanepredictions.org

Profiling a climate services team



- Designer feedback on data visualisation (figures, color scales, etc)
- Development of advanced data visualisation platforms
- User interface evaluations (e.g. eye tracking)

PhD	Post-Doc	Technical expert	Manager	Communication specialist	Social scientist	Visualisation team

Conclusions

1. Multidisciplinary teams allow multiple perspectives and problem-solving approaches. Distributed teams have very steep learning curves, it requires a lot of effort and time, and are not always easy to manage and facilitate.

PhDs	Post-Docs	Technical experts	Managers	Communication specialists	Social scientists	Visualisation team

2. Climate services can't afford following a unidirectional path. More importantly: creating a climate service is not even a linear process.

Only by doing things different you can find different solutions

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Thank you!

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EUPORIAS

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