WEBINAR

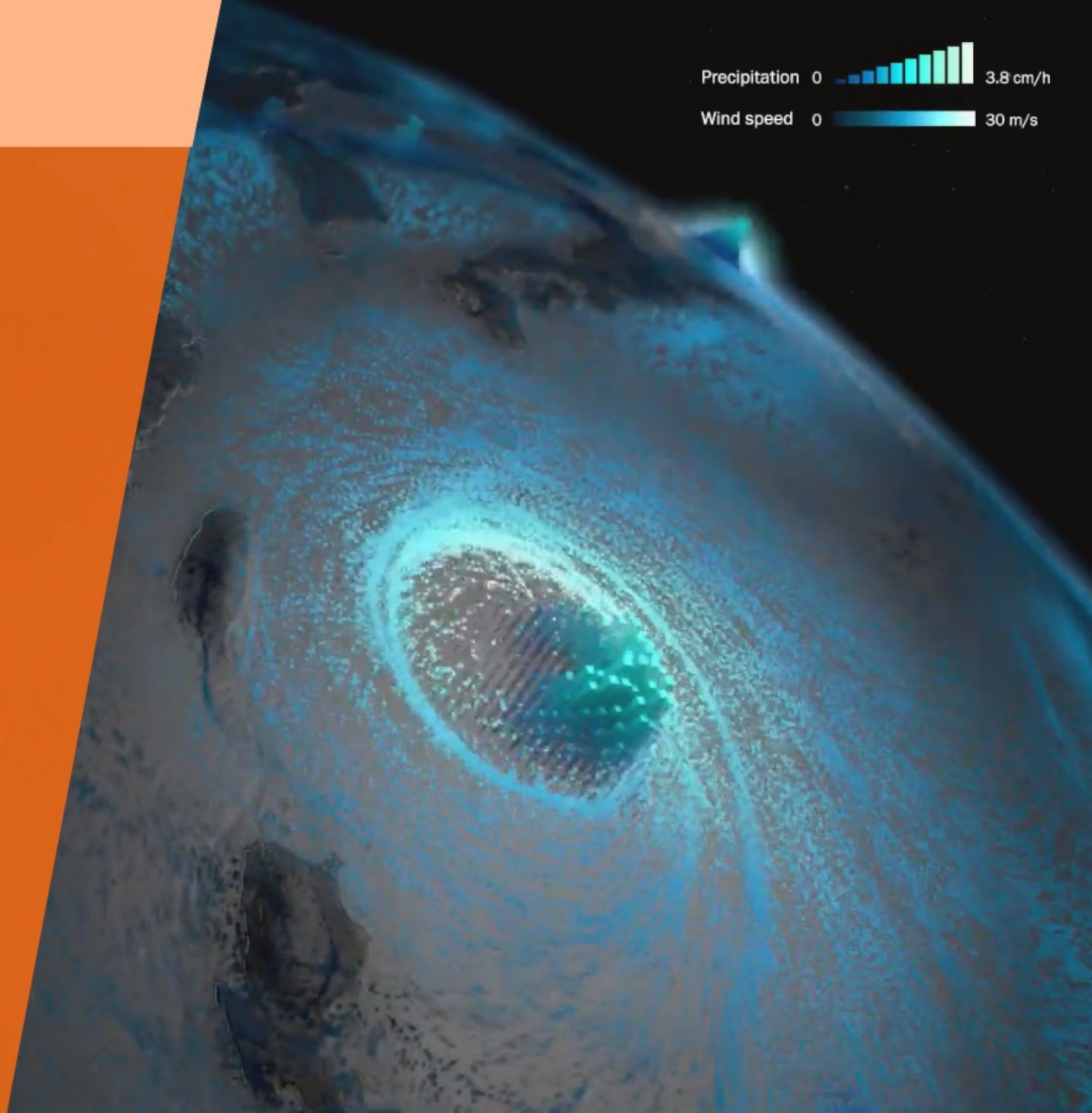
24 FEBRUARY 2021
15:00 - 16:00 CET

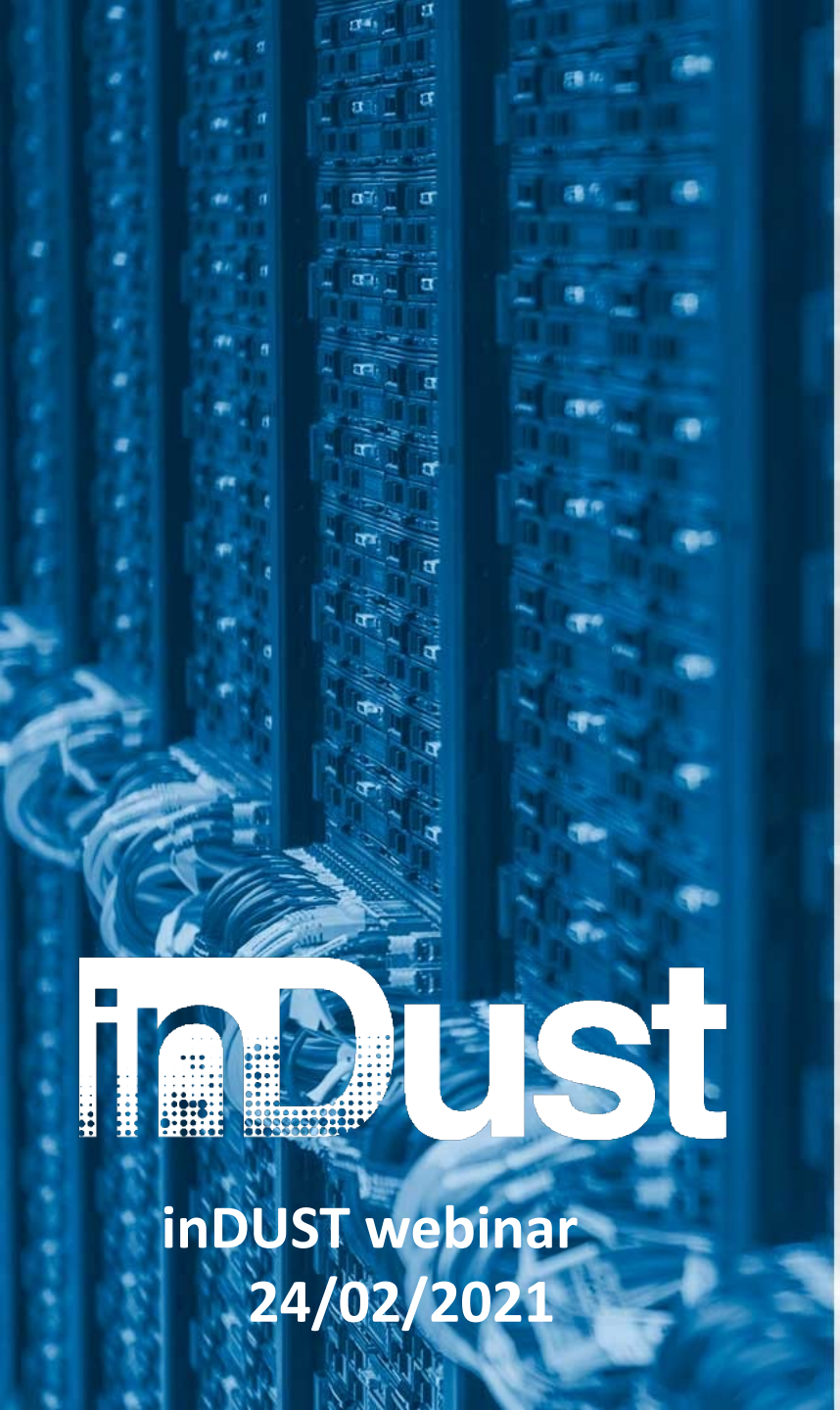
DATA VISUALISATION IN USER-TAILORED PRODUCTS

Isadora Jimenez
Barcelona Supercomputing Center

inDust

cost
EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY





inDUST

inDUST webinar
24/02/2021

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

EXCELENCIA SEVERO OCHOA

Data Visualisation in user-tailored products

Isadora Christel Jiménez

Head of Knowledge Transfer team, Earth Sciences Department

Building on the knowledge of **many BSC colleagues**: Marta Terrado, Dragana Bojovic, Diana Urquiza, Konstantina Chouta, Andria Nicodemou, Sara Octenjak, Jose Canovas, Miguel Segura, Marina Conde, Ilaria Vigo, Asun Lera St. Clair, Luz Calvo, Guillermo Marin, Fernando Cucchietti

1990

SO, THIS CLIMATE CHANGE THING COULD BE A PROBLEM..



1995

CLIMATE CHANGE: DEFINITELY A PROBLEM.



2001

YEP, WE SHOULD REALLY BE GETTING ON WITH SORTING THIS OUT PRETTY SOON...



2007

LOOK, SORRY TO SOUND LIKE A BROKEN RECORD HERE...



2013

WE REALLY HAVE CHECKED AND WE'RE NOT MAKING THIS UP.



2019

IS THIS THING ON?

TAP TAP TAP



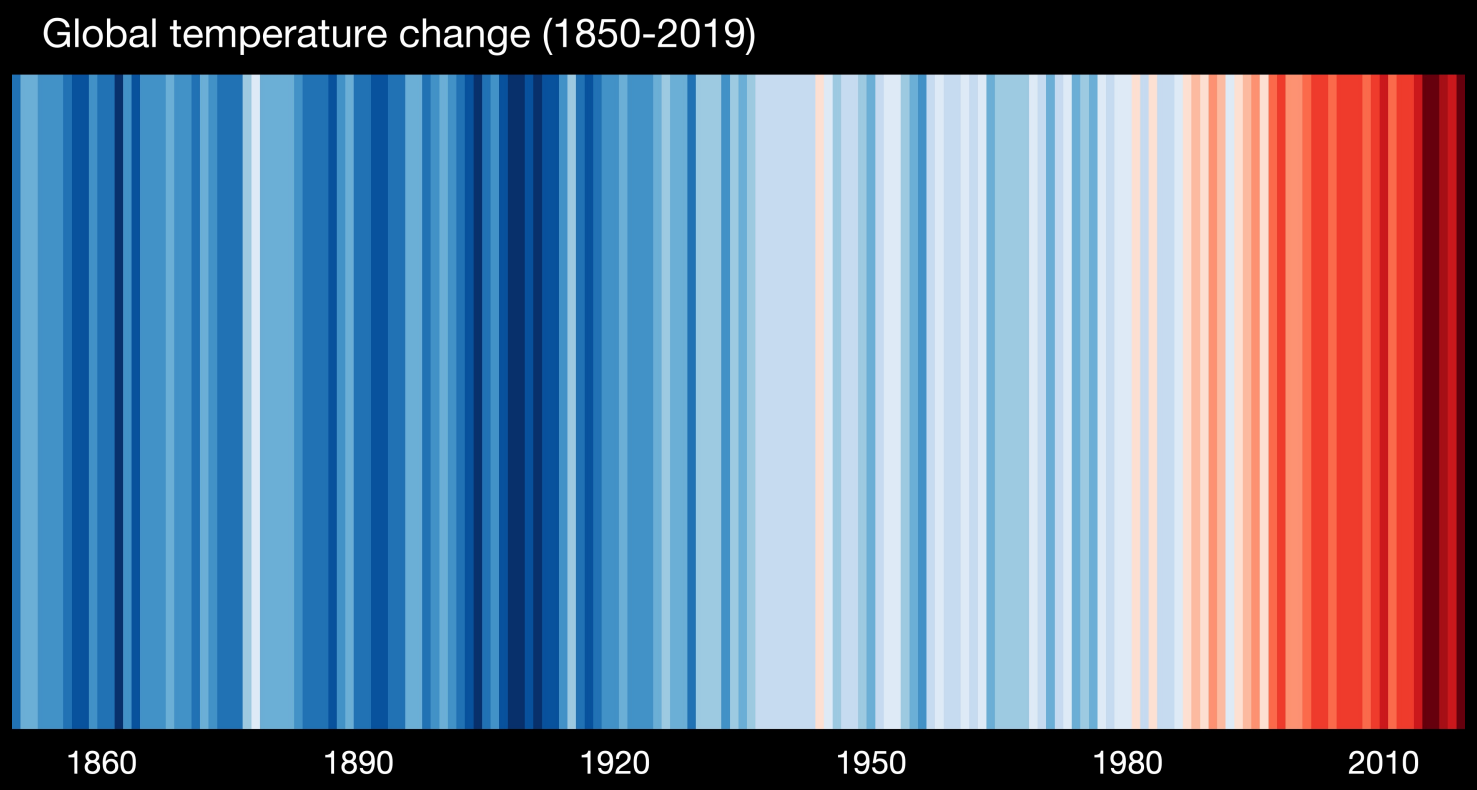
KUDRNA. 28/9/13


There is
NO Planet B


GRETA
THUNBERG
NO ONE
IS TOO SMALL
TO MAKE
A DIFFERENCE
NO ONE IS TOO SMALL TO MAKE A DIFFERENCE
GRETA THUNBERG

` v v ÇM8z

í MÜ Zz ≒z ÀÊ½óÊž^zł^Œ



` Ê Ê±¾Œˆ
¨ ˆÊ†≥
†ž≥Õ±Æ¨ ##

s Ê/ÕŒ¾fl †◊π˚·



M¶≥ž·ł˚¾



-ÕØ

Ù ÊπÆŒÕ‡



##†‡≥ fl †‡¾fl Ê˚π

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Üz8vlVÇ MZf v82 svf [redacted]

v †Ôπ ½†ˆ ¤‡π·

8‡«†«πfl π¤‡ł

złÊˆ¾/ÕŒ« ΔÊfl ≥†ł†

W‡Ê½/π≥«π łˆ†‡· Δπˆ

·žÛÛÊˆł ≥πÆÕŒ‡

fl †◊ÕŒ«

#Çˆ Õ«πˆ †ÆÕŒ‡

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Ü· π^IWt ÕÊ^ π≥
Û^Ê≥žÆ ‡ππ≥ †
Ç^†‡· ≥ÕÆŒÙÕ‡†^¾
†ÛÛ^Êt Æ



≠2π· Õ‹‡

- a ≠Ü· π^ IV π‡ł^ ÕÆ≥π· Õ‹‡
- e ≠í ÕŽ†/ π‡ÆÊ≥Õ‡«
- i ≠- Ê⁄ÊŽ^
- o ≠Ü‡Æ˘^ł†Õ‡ł¾
- u ≠M‡łπ^†ÆÕ‡« ½Õ‡À Õ‡Æ˘^fl †łÕ‡‡
- c ≠Çπ^fl Õ‡Ê⁄Ê«¾
- d ≠Z†‡«Ž†«π

2π· Õ‡ ZZ †ˆÊž ′ ¨ žł ½π Ê‡/¾
ˆπ†/Õπ ½Àπ‡ ÕE MZ

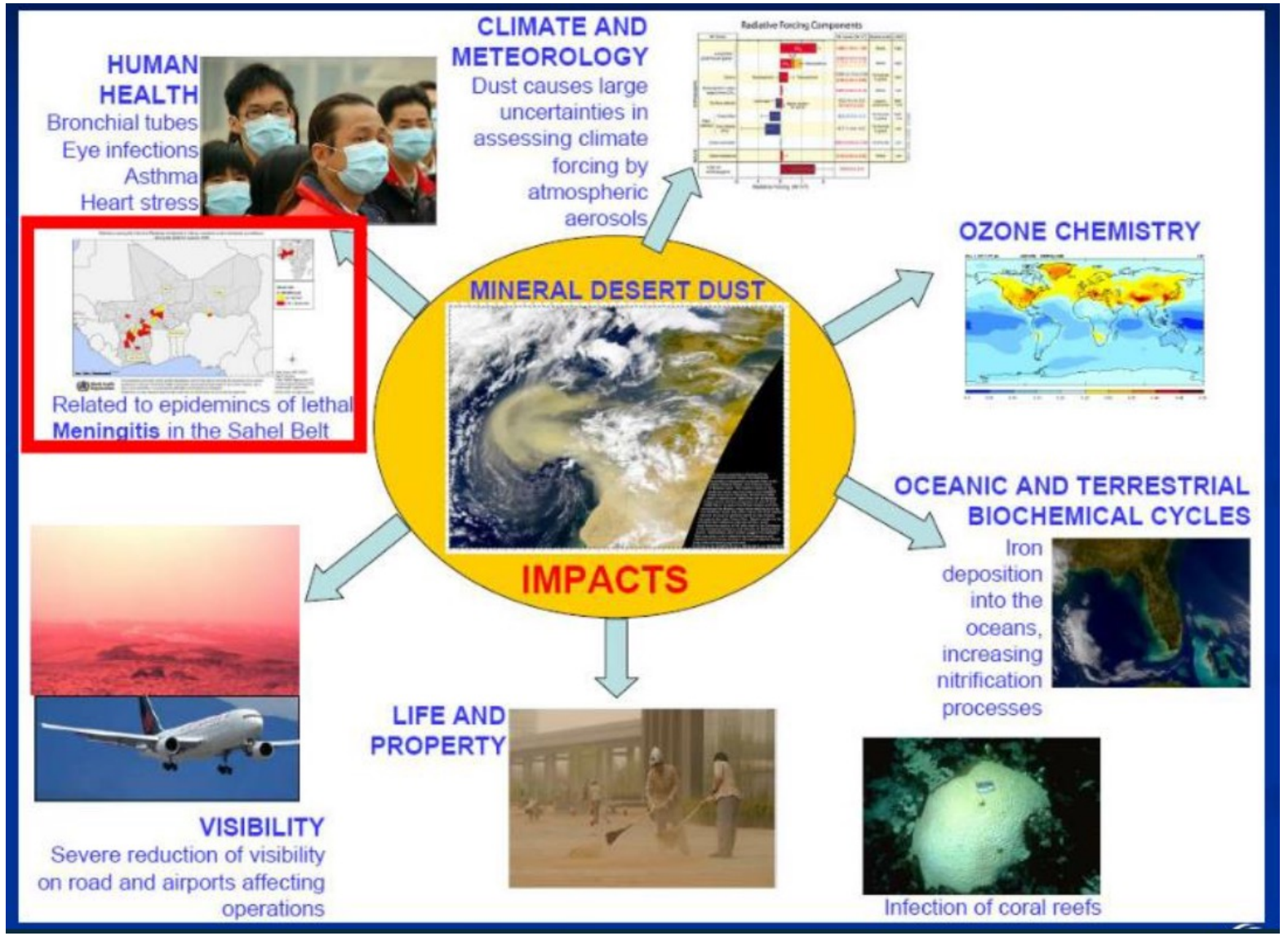


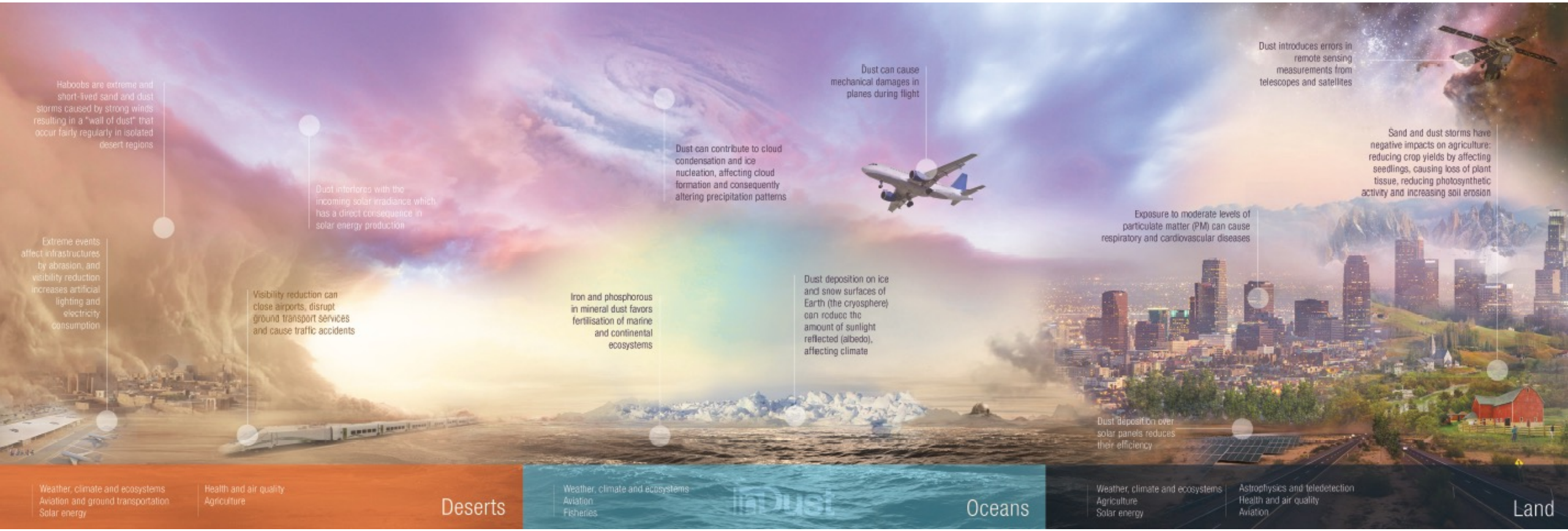




ï f ï Δ†ÆÊˆ″ π·ł Àπł Õ Æ †/· Ê fl †ł ł πˆ

ï π †// À†³ π
Ü†Æ Ê†· Æ Õ Ž·
¨ Õ· π·

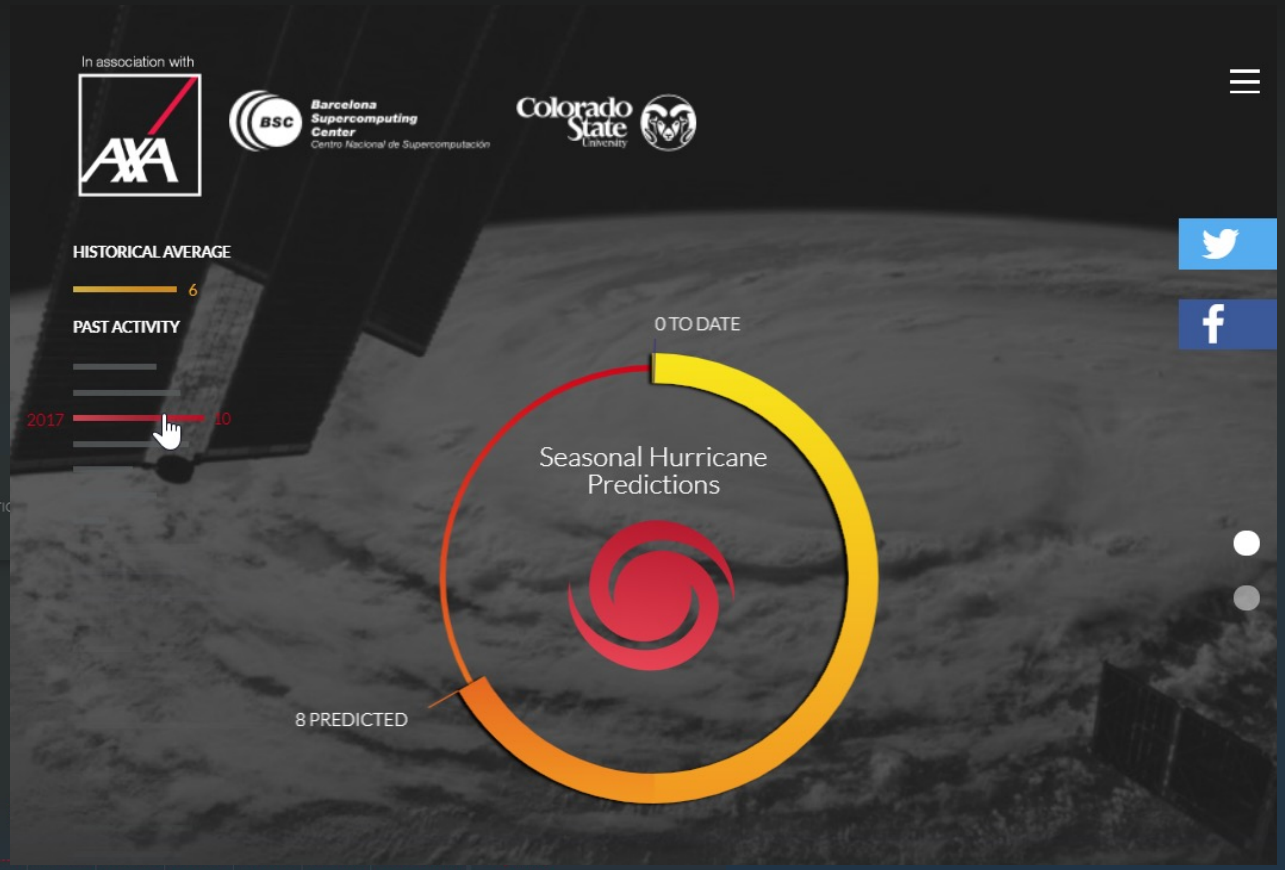

HUMAN HEALTH
Bronchial tubes
Eye infections
Asthma
Heart stress
Related to epidemincs of lethal Meningitis in the Sahel Belt
CLIMATE AND METEOROLOGY
Dust causes large uncertainties in assessing climate forcing by atmospheric aerosols
Radiative Forcing Components
MINERAL DESERT DUST
IMPACTS
OZONE CHEMISTRY
OCEANIC AND TERRESTRIAL BIOCHEMICAL CYCLES
Iron deposition into the oceans, increasing nitrification processes
LIFE AND PROPERTY
Infection of coral reefs
VISIBILITY
Severe reduction of visibility on road and airports affecting operations

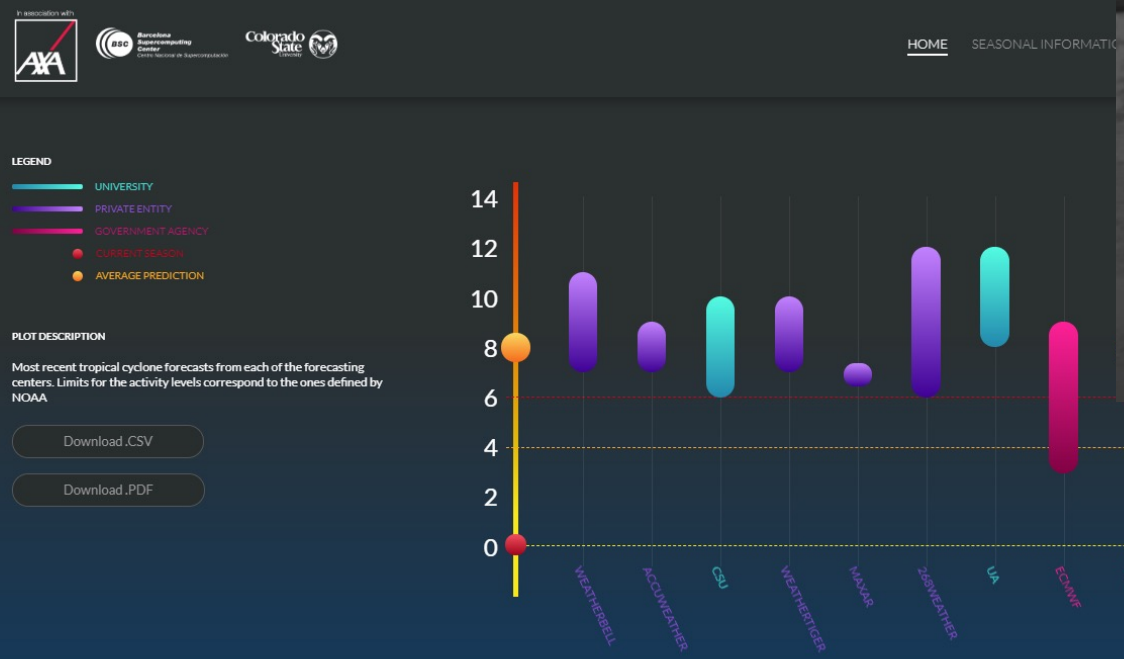


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ÀłÛ ∫∫ ÆÊ· łIVQ≥ž · ł≠ž∫ fl π≥ÕIV
ˆÊÊfl∫ˆπ· ÊžˆÆ·

½½½≠ πŧ˙ Êǂŧ/Àž^^Ø₧ǂπÛ˙ π≥Ø₧ÊØǂ ˙ ≠Ê^«





FORECAST EXPLANATION

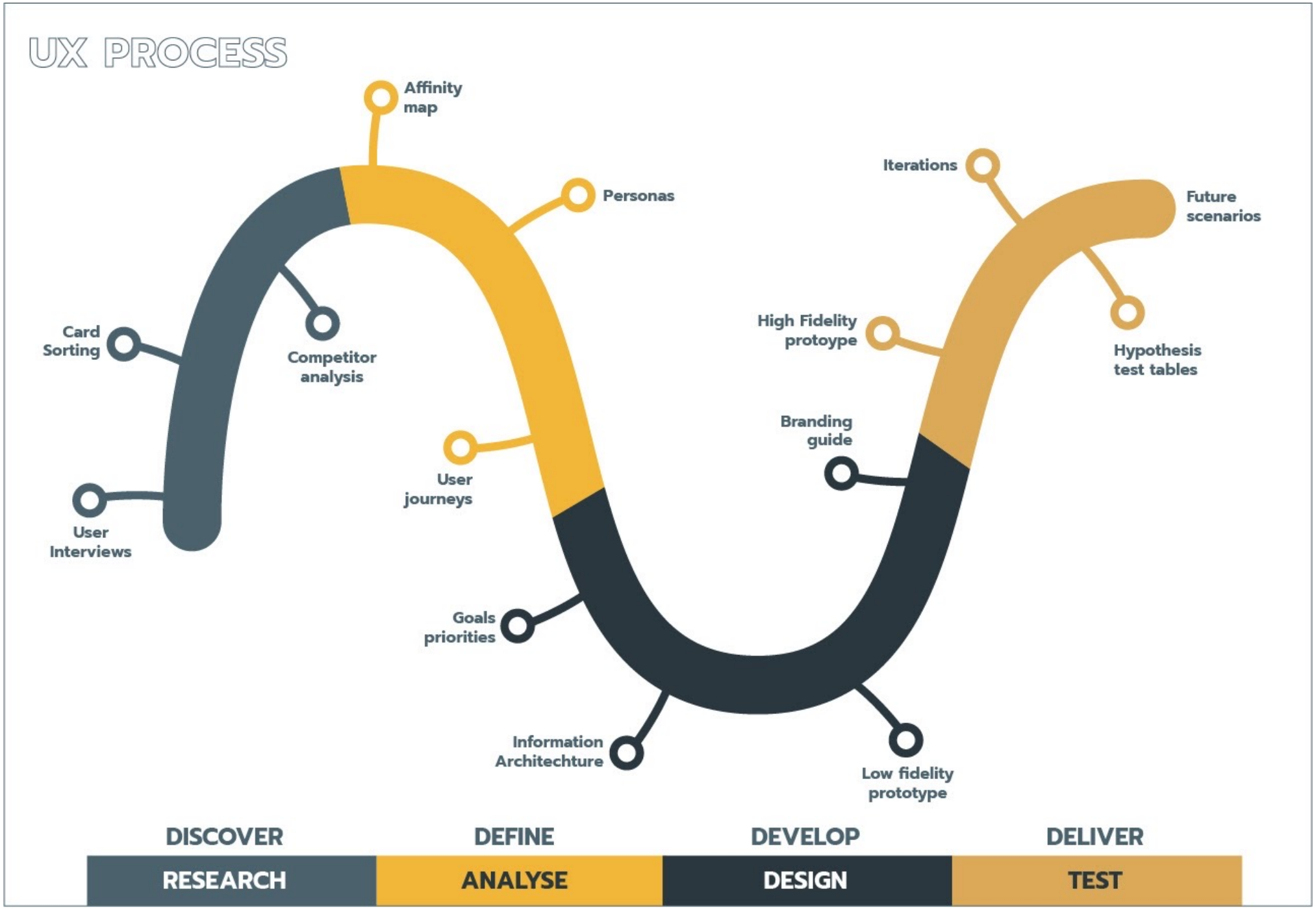
The Atlantic hurricane season begins on 1 June, and over one dozen groups have already issued seasonal hurricane forecasts for the 2020 season. To date, most groups have predicted an above-average season, with several forecasting an extremely active season (e.g., 9+ hurricanes). The spread in these early season predictions is somewhat less than we have seen in recent years. Several months

season historically ramps up in August, and consequently, significant alterations in seasonal forecasts are possible. For example, if the tropical Pacific were to anomalously warm and tropical Atlantic SSTs were to anomalously cool, seasonal forecasts would likely decrease. Alternatively, if La Niña appeared more likely and the tropical Atlantic remained warmer than normal, seasonal forecasts could be

zÊfl πłÕ π˙ łÀπ ÛˆÊ≥žÆÕ †˙ ˙Õ ÛΠ†˙
ÛˆÊ³Õ≥Õ« π†˙ ¾†ÆÆ˙ ˙ łÊÕ⁄Êˆfl †łÕ‡
Õ† ½Π// ≥π˙ Õ‹‡π≥ Û†«π



› ≠2π· Õ‹‡
a ≠Ü· π^lV π‡ł^ÕÆ≥π· Õ‹‡
e ≠í ÕŽ†/ π‡ÆÊ≥Õ‡«
i ≠- Ê⁄ÊŽ^
o ≠Ü‡Æ˚^ł†Õ‡ł¾
u ≠M‡łπ^†ÆÕ‡« ½Õ‡À
Õ‡Æ˚^fl †łÕ˚‡
c ≠Çπ^fl Õ‡Ê⁄Ê«¾
d ≠Z†‡«Ž†«π


UX PROCESS
Affinity map
Personas
Card Sorting
Competitor analysis
User Interviews
User journeys
Goals priorities
Information Architechture
Iterations
Future scenarios
High Fidelity protoype
Hypothesis test tables
Branding guide
Low fidelity prototype
DISCOVER
DEFINE
DEVELOP
DELIVER
RESEARCH
ANALYSE
DESIGN
TEST

M¢ł π^³ Ø½·

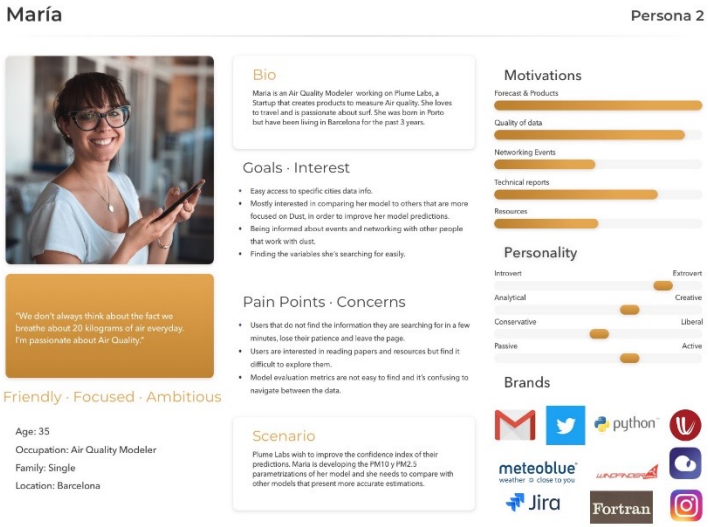
2 π Ø¢ π ž · π^ Û^ Ê Ø¢ π·

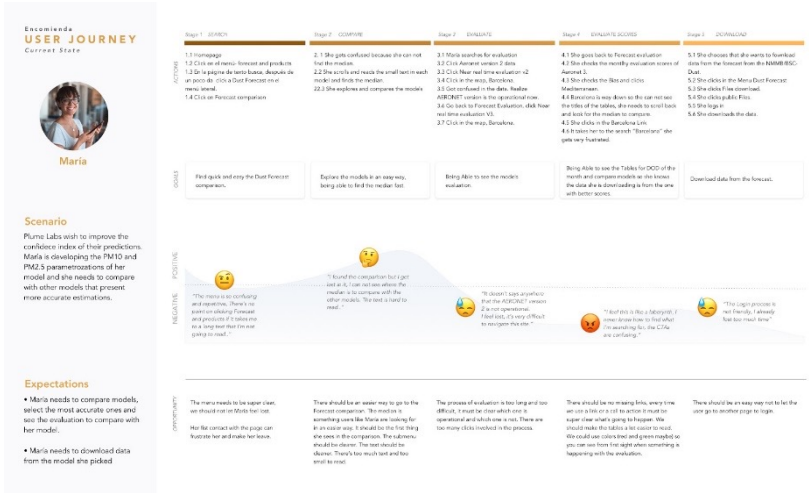
°Ê π^ · Ê ‡ † · K

Ü· π^ ‡Ê ž ^ ‡ π¾

Δ Ø¢ Ø¾fl †Û·







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- ÊlVÆπ†łŒ±
½Ê^^¨ÀÊlÛ¦



- Ê±¨ł†‡ł Δπ≥¨†Æ† †‡≥ łπ¨łŒ« ½ŒÀž¨π^¨

- 8¾πł^†ÆŒ« łπ¨ł¨
- Gžπ^^Ø† łπ¨łŒ«
- +ŒÊ/†^ Z†≥≥π^Œ« fl πłÀÊ≥
- vπÆ^^π‡ł łπÆÀ±ØŒ/ fl ππłŒ«¨
- ` π½ Œłπ^³Œ½¨
- ″

// ł À Õ Õ ž · π ≥ ł Ê ¨ ž Ø ≥ †

≥ π fl † ‡ ≥ l ¥ ˆ ③ π ‡ ž · π ˆ l ₩ † Ø Ê ˆ π ≥

Û ˆ Ê ≥ ž Æ

- ˆ π†ł Ω« †

Gf f 2 ∫ z Ü- - 8 z z EÜZ ∫ Üz 8 EÜ

ž · π ˆ lΨ† ÕÊ ˆ π≥ Û ˆ Ê≥ž Æ À† · fl †‡¾

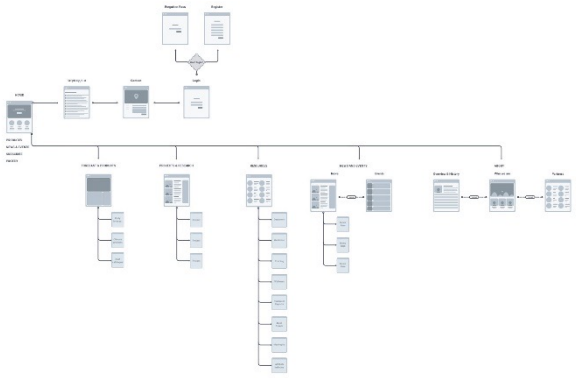
· ł π Û

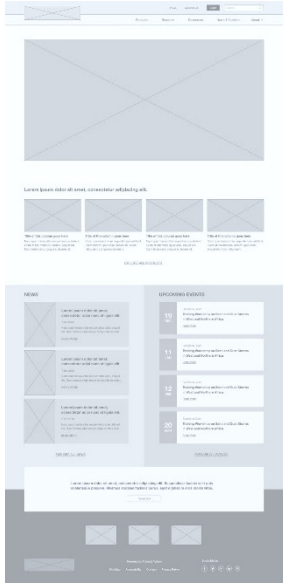
M¶ÆÊˆfl †ł ŒÊ‡ †ˆÆÆÃÕπÆÆžˆ π

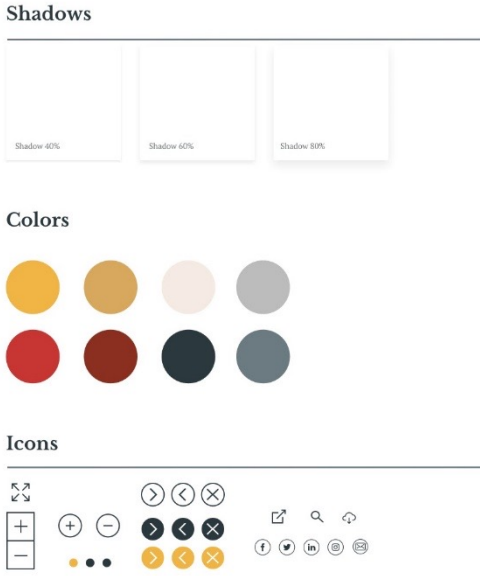
ZÊ½ ÆÕ≥π⁄Ø¾ Û ÊÈÊ¾Ûπ

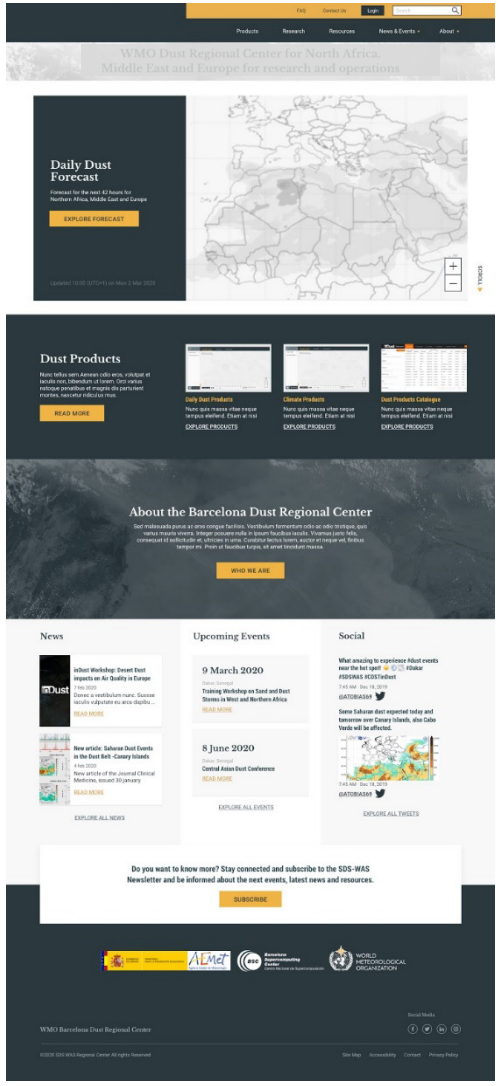
+ˆ†‡≥Ø«« «žÕ≥π

KÕÀ ÆÕ≥π⁄Ø¾ Û ÊÈÊ¾Ûπ









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ÇÀÕ Õ †ł łÀπ ÆÊˆπ ÊΔ
fl Ê· ł Ûˆ③†łπ · πÆÆÊˆ
Ûˆ Ê≥žÆ· ##

##†‡≥ † ‡ππ≥π≥ · łπÛ ÆÊˆ †‡¾
Ê‡/Õ†π Ûˆ Ê≥žÆ∫ Õ†łπˆ Δ†Æ‹



› ≠2π· Õ‹‡

a ≠Ü· π^IV π‡ł^ÕÆ≥π· Õ‹‡

e ≠í ÕžŧA Ê≥Õ«

i ≠- Ê/Êž^

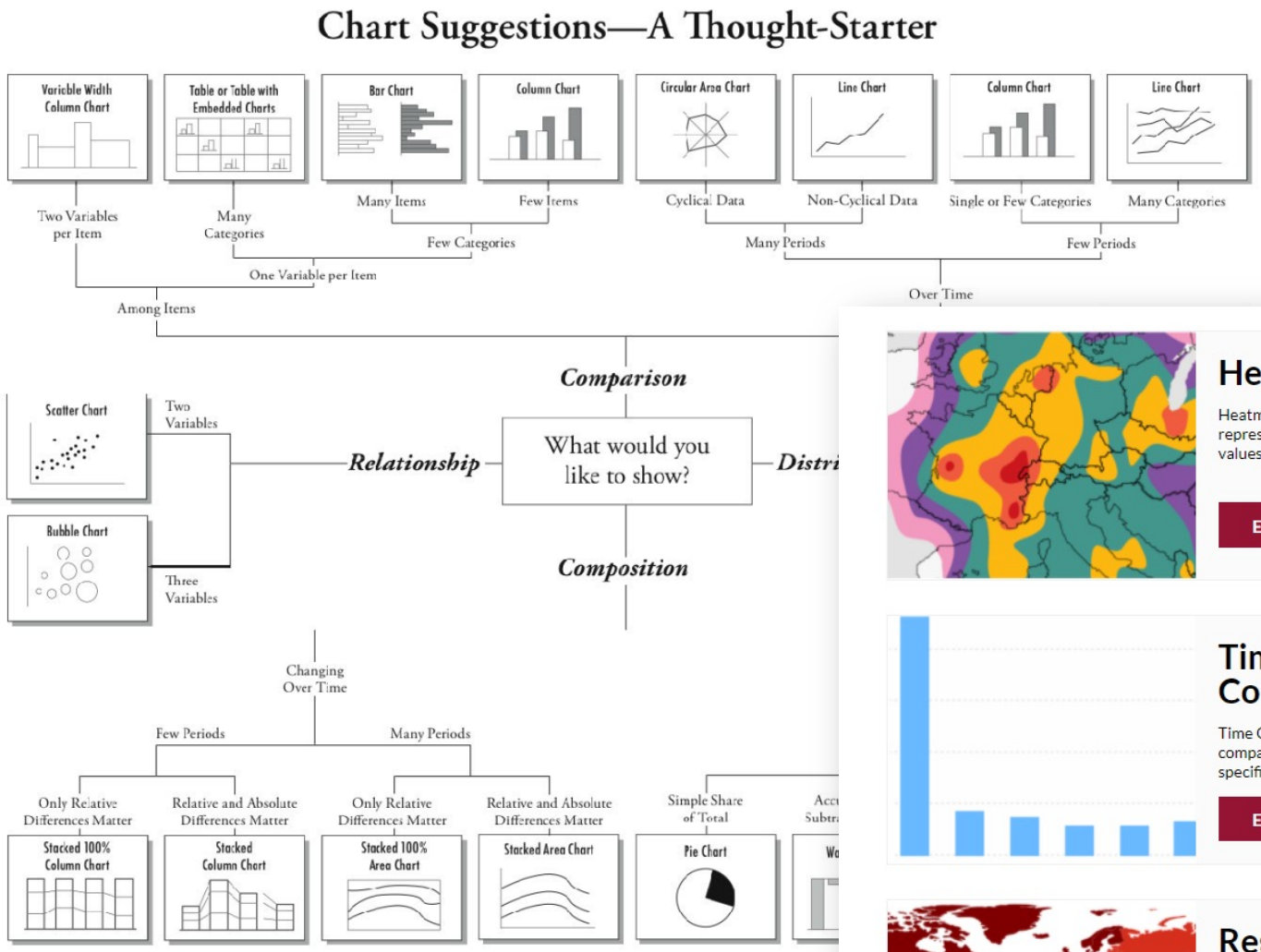
o ≠Ü‡Æ˘^ł†Õłł¾

u ≠Młł π^†ÆÕ« ½Õ‹À

ÕÆÊ^fl †łÕ‡

c ≠Çπ^fl Õ‡Ê/Ê«¾

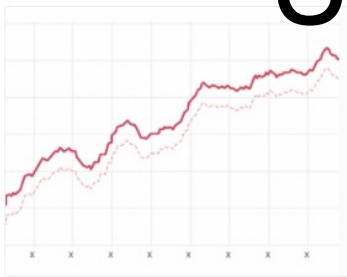
d ≠Z†‡«ž†«π



Heatmap

Heatmaps are graphical representations of data where values are depicted by colours.

EDIT & DOWNLOAD



Timeseries

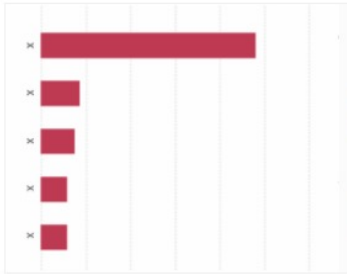
Time series show how multiple dimensions compare over time, spot trends, and seasonal changes in data.

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Time Comparison

Time Comparison allows you to compare a selection of a period in a specific time scale.

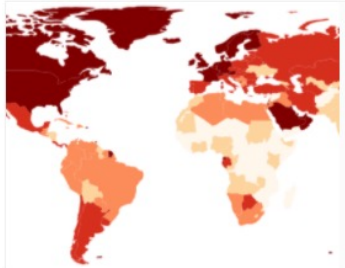
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Ranking

Ranking charts are an effective way to show data ranked in an ascending or descending order.

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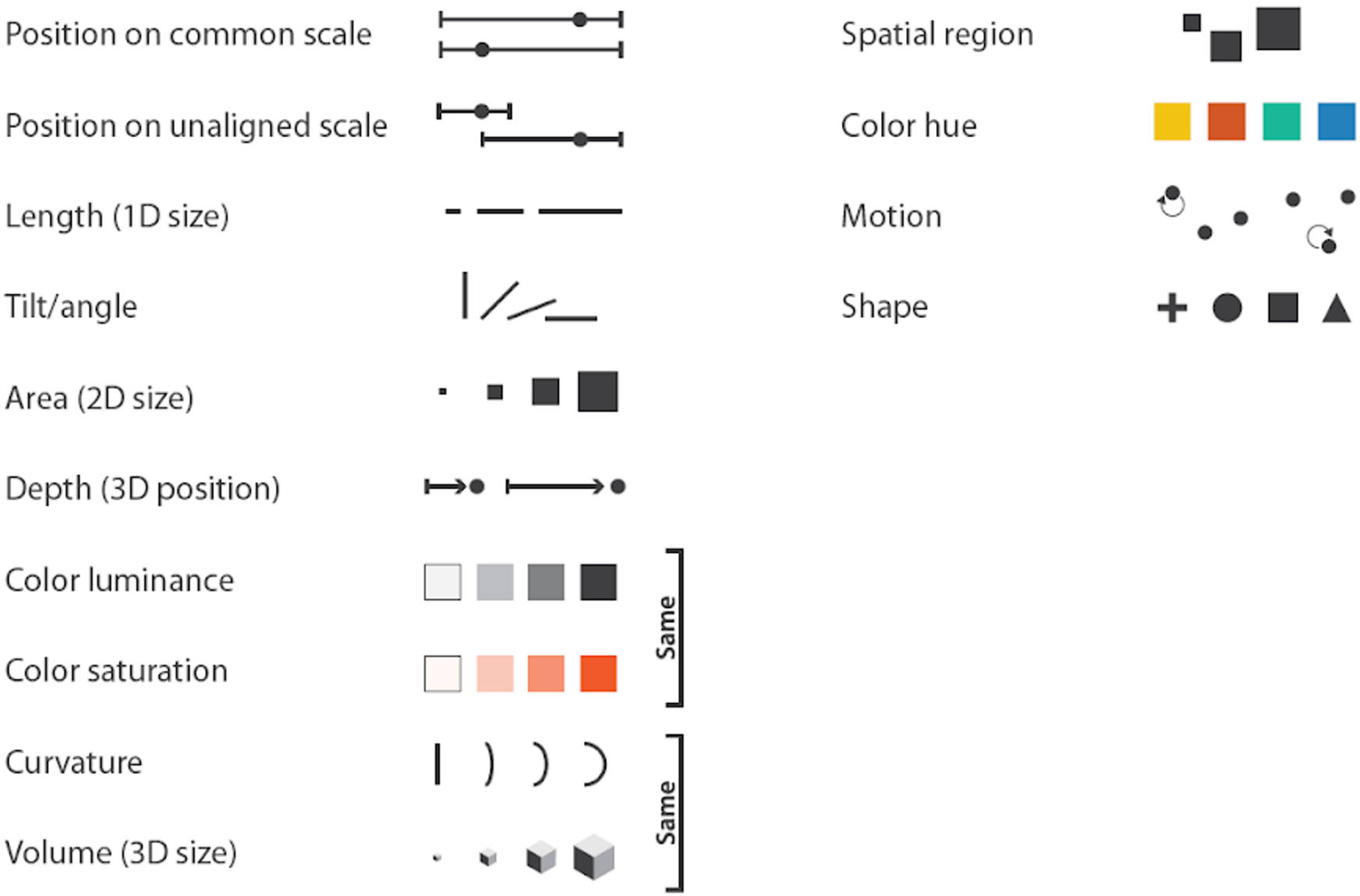


Region Maps

Region maps display regions that are coloured, shaded or patterned in relation to a variable.

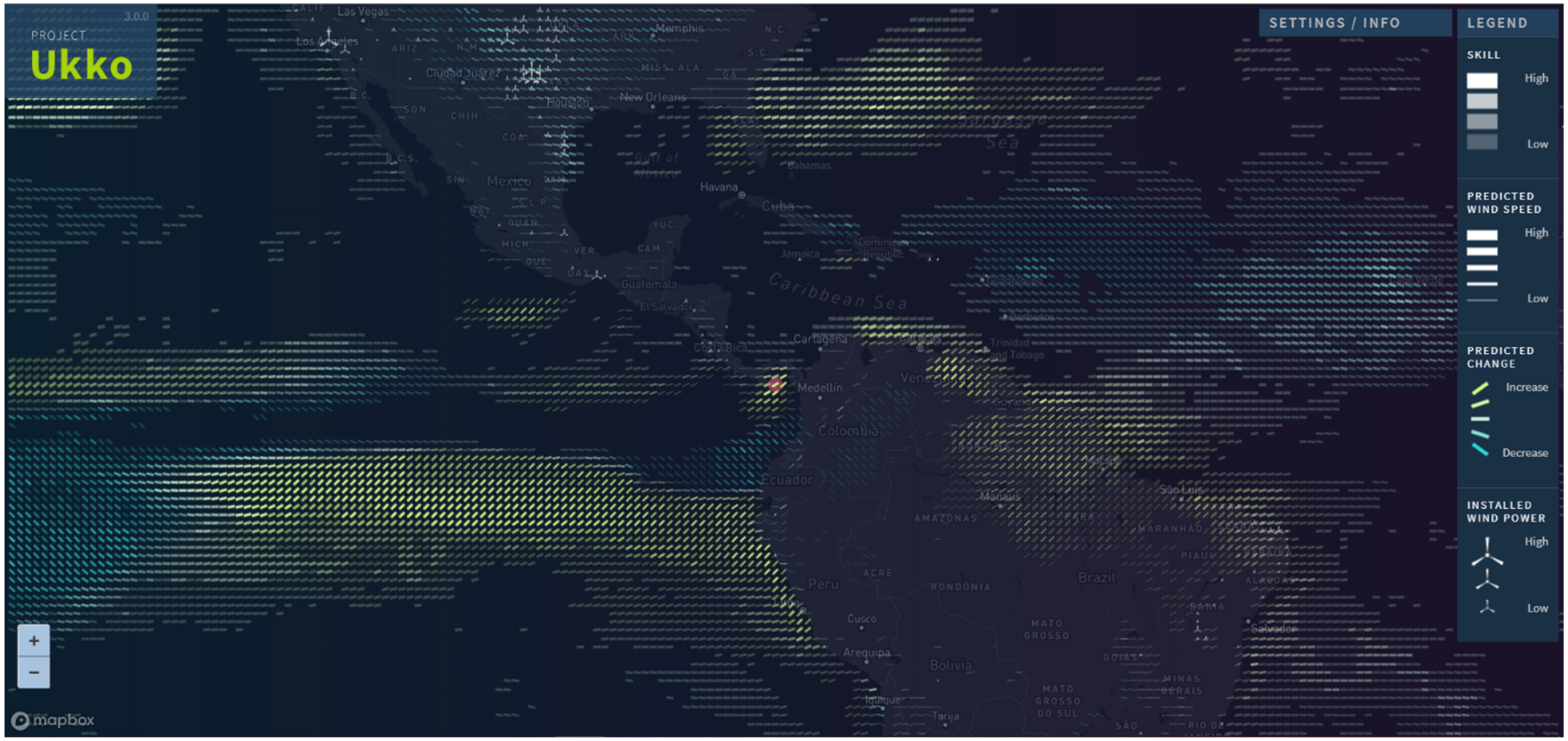
EDIT & DOWNLOAD

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ΔÊfI ÇÀπ Ç ž ł À Æ/ ˆł≠- †ÕÊ ≠

` Ê ┼// ╥╪ÆÊ≥Ø« Õ ╥ı ž┼//¾«ÊÊ≥″


PROJECT
Ukko
3.0.0
SETTINGS / INFO
LEGEND
SKILL
High
Low
PREDICTED WIND SPEED
High
Low
PREDICTED CHANGE
Increase
Decrease
INSTALLED WIND POWER
High
Low
Las Vegas
Memphis
Houston
New Orleans
Havana
Cuba
Bahamas
Mexico
Guatemala
El Salvador
Caribbean Sea
Cartagena
Medellín
Colombia
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Cusco
Arequipa
Manaus
São Luís
Trinidad and Tobago
Jamaica
Dominican Republic
mapbox

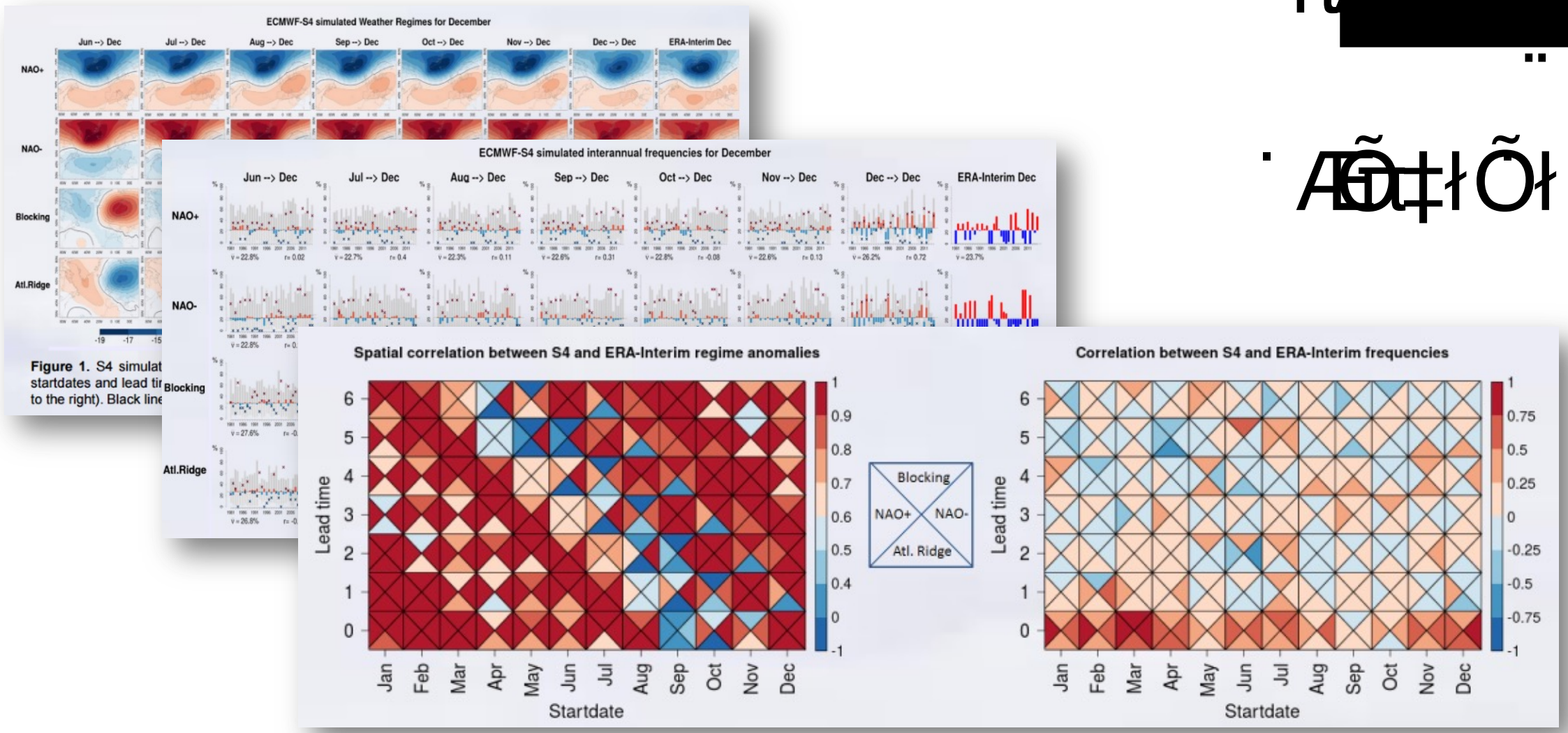


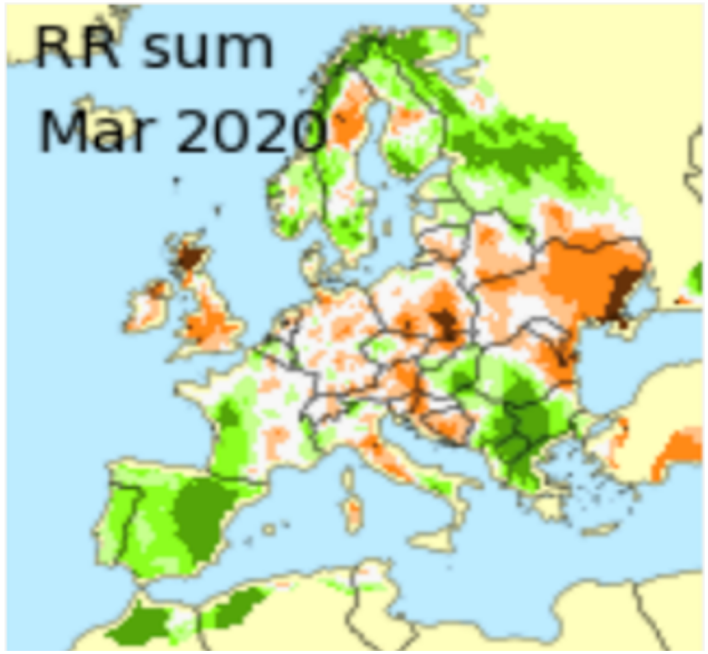
Figure 1. S4 simulat
startdates and lead ti
to the right). Black line



› ≠2π· Õ‹‡
a ≠Ü· π^IV π‡ł^ÕÆ≥π· Õ‹‡
e ≠í ÕŽ†/ π‡ÆÊ≥Õ‡«
i ≠- Ê⁄ÊŽ^
o ≠Ü‡ÆŒ^ł†Õ‡ł¾
u ≠M‡łπ^†ÆÕ‡« ½Õ‡À
Õ‡Æ^fl †łÕ‡
c ≠Çπ^fl Õ‡Ê⁄Ê«¾
d ≠Z†‡«Ž†«π

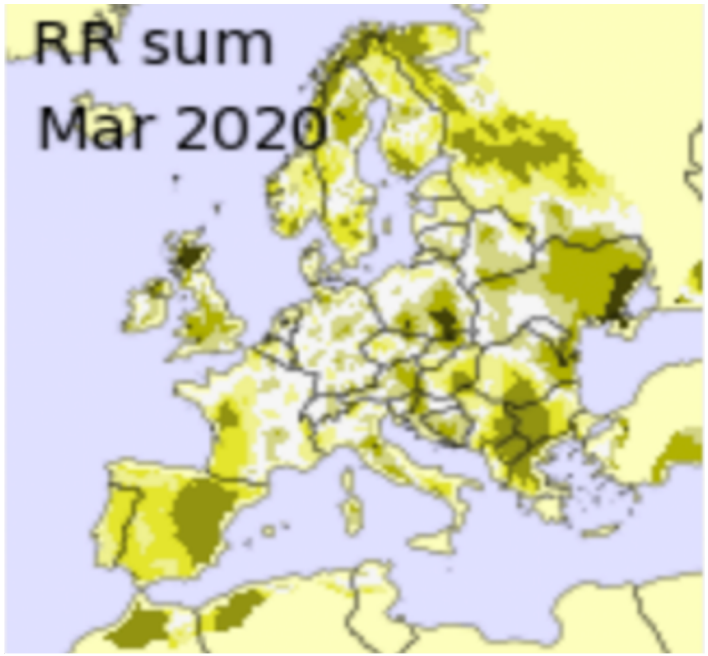
` Êª †// ÆÊ/Êž^ · ÆÆ/π· †^π^ÕÀ‡

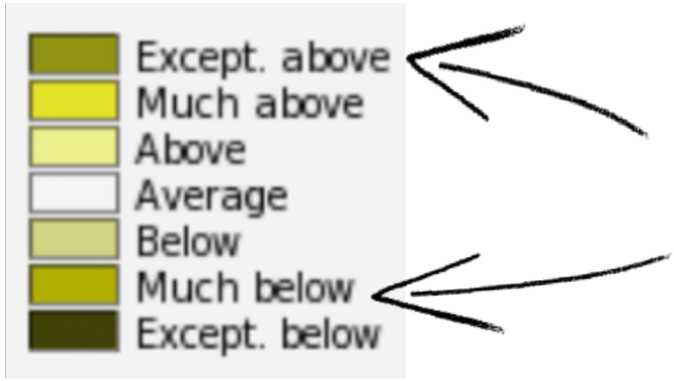
+žØ≥ ÆÊ/Êž^ÌŸ/Ñ¢≥ Δ^Õ¢±≥/¾Û^Ê≥žÆÆ



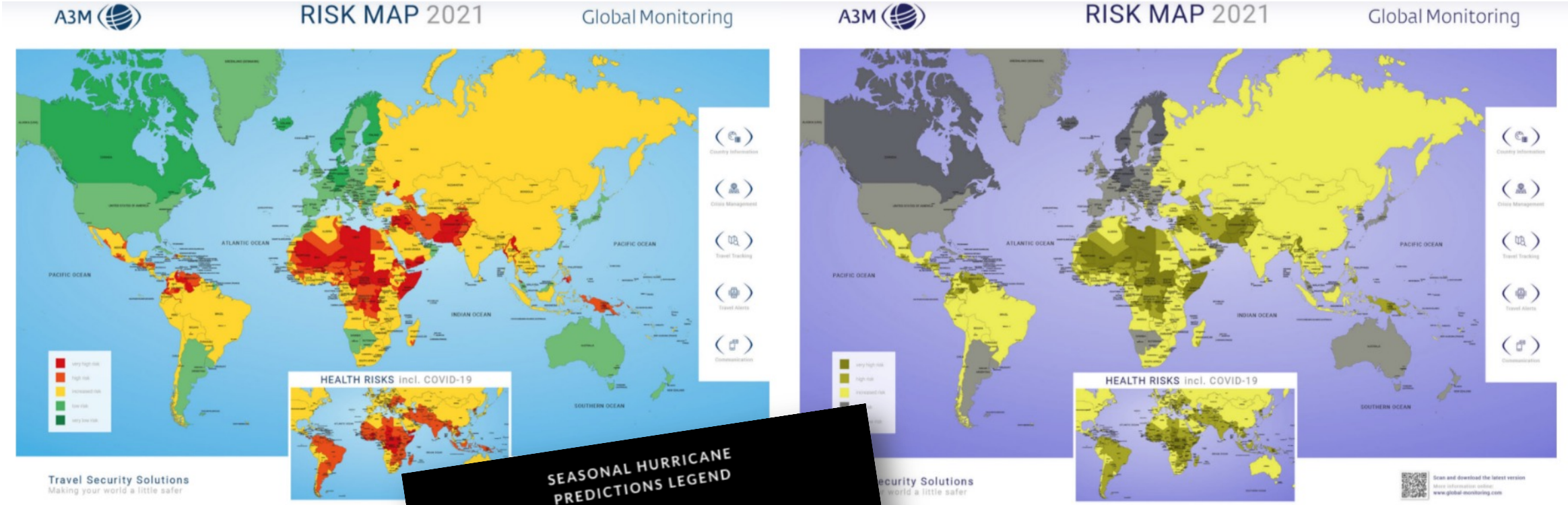
Ü· ž†/ ÆÊ/Êž^
· Æ¶/π ÆÊ^
Û^πÆÕÕÕ†ł(Õ‡







- Ê/Êž^ IV
¨/Õ¶≥
· Õ) ž/†łÕ‡





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` Êª †// ÆÊ/Êž^ · ÆŦ/π· †^π^ÕÀ‡

+žØ≥ ÆÊ/Êž^IV/Ф≥ ΔÕ¤≥/¾Û^Ê≥žÆ

_ Ф≥ Àžfl †‡ Ûπ^ÆŒÛ‹ÕŒ‡

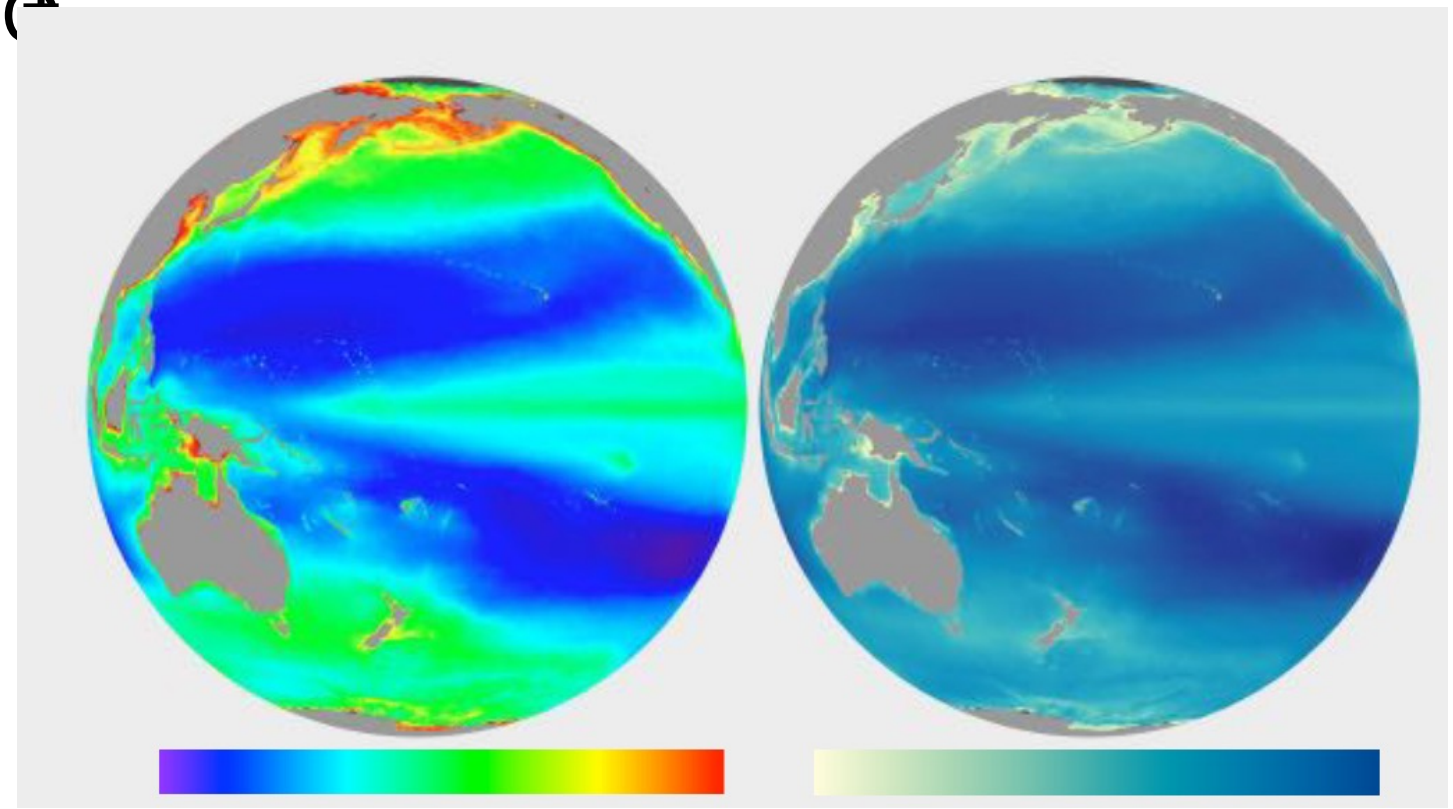
ÇÀπ v †Œ¨ Ê½ ÆÊ/Êž^

- ÆÊ/ππ ÆÊ/Êž^· ¨^ÕÀłπ^ łÀ†‡ Ê÷Àπ^·
- Mdłπ^ÛÊ/†łŒ‡ Õ ‡Ê÷ Ûπ^ÆÛłž†//¾ /Œππ†^
- `ÊÆÊ‡łŒžÊž·³†^Œłœ‡ Õ /ÕÀł‡π·
- `ÊŒÀπ^π‡ł fl π†‡Œ« Æ ¨^π†◊·

°Ø/π†·

2Ê‡Œž·π

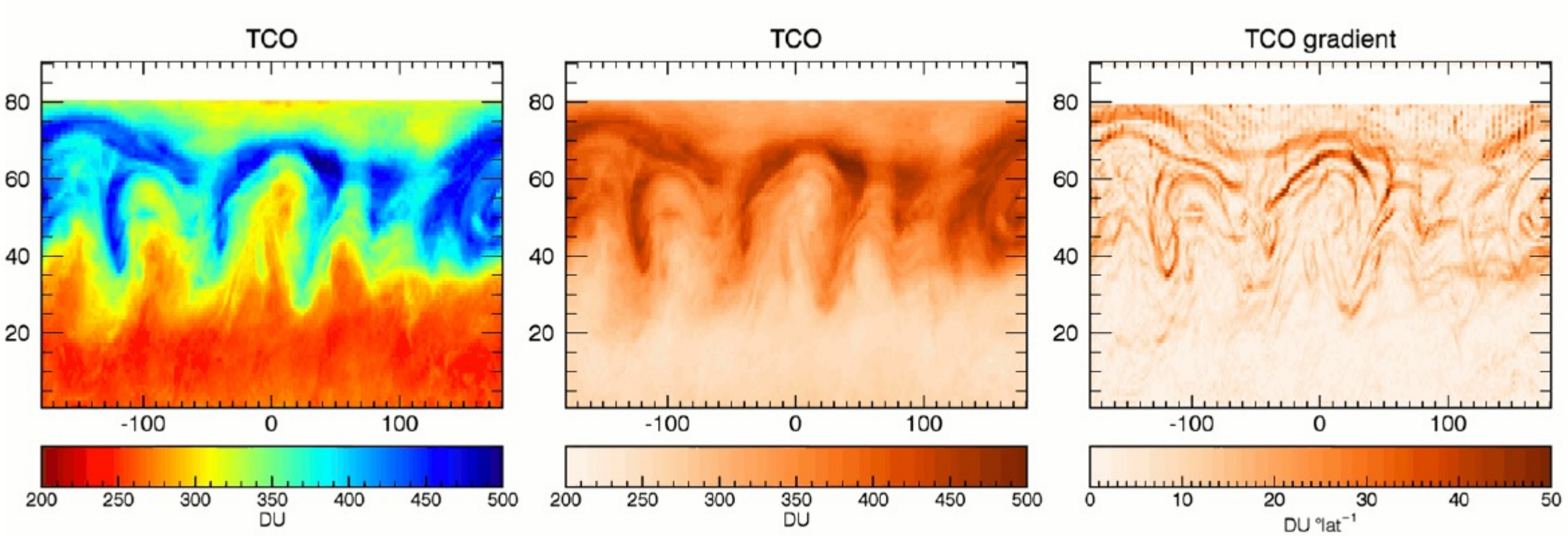
zÊž^Æ·/Õπ¨¾
GžØπ^fl Ê_†^Œ



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ï ˆÊ‡« ÆÊ/ÊžˆÌ Æ‡/π Æ‡‡ Ì ÀÊ½

ΔπÆÊ ‡Ê Ûˆπ˙ π‡ł Õ ≥†ł†



Zπ†ˆ‡ fl Êˆπ †î ÀłÛ ∫∫ ½½½≠ÆÕ †łπlѵ¨ lѵÊÊ◊≠ÆŽ◊ ¸ ¸ ∫ π‡≥lѵÊΔlѵÀπlѵ†Õ¨ Ê½/

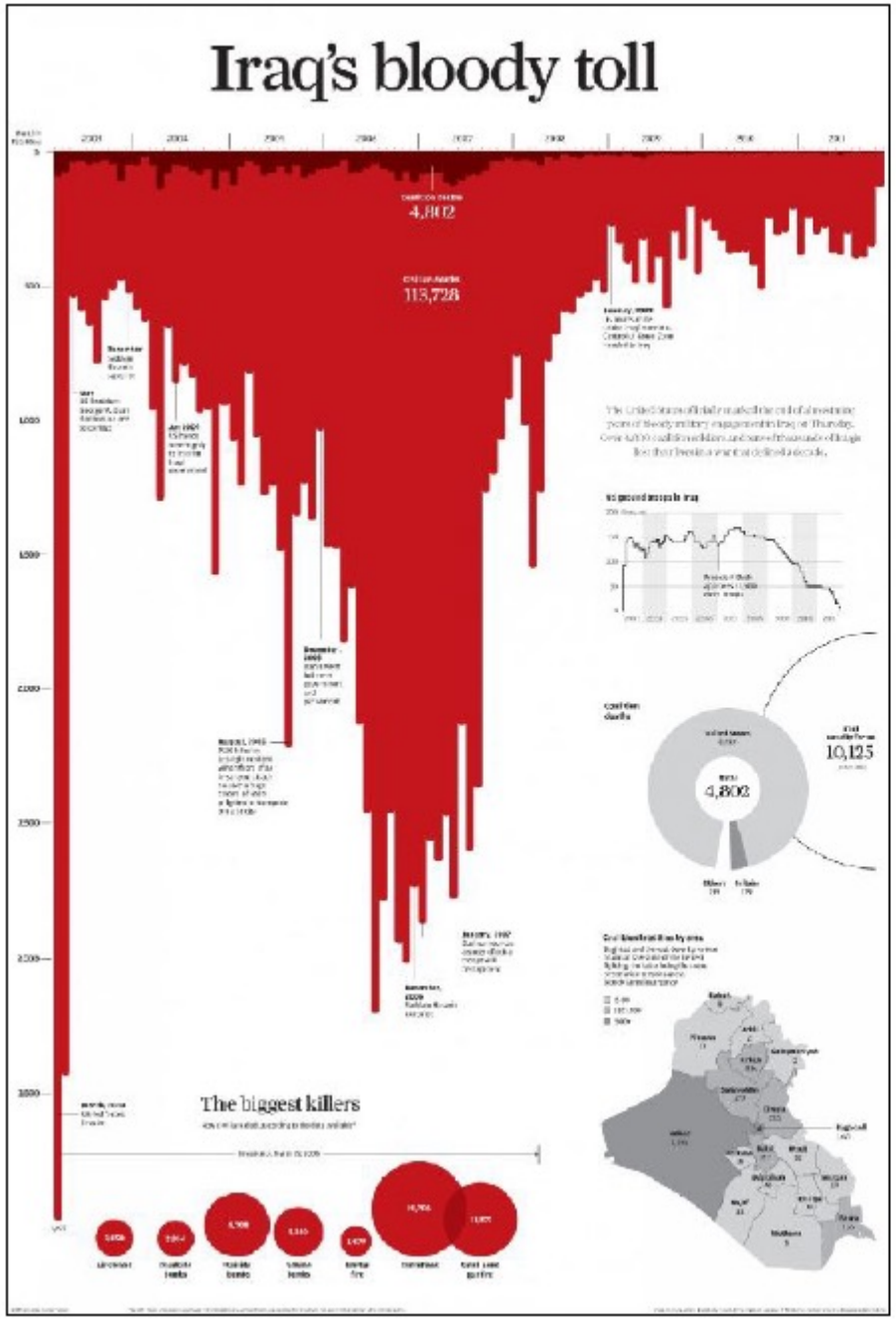
Sean Davis, NOAA

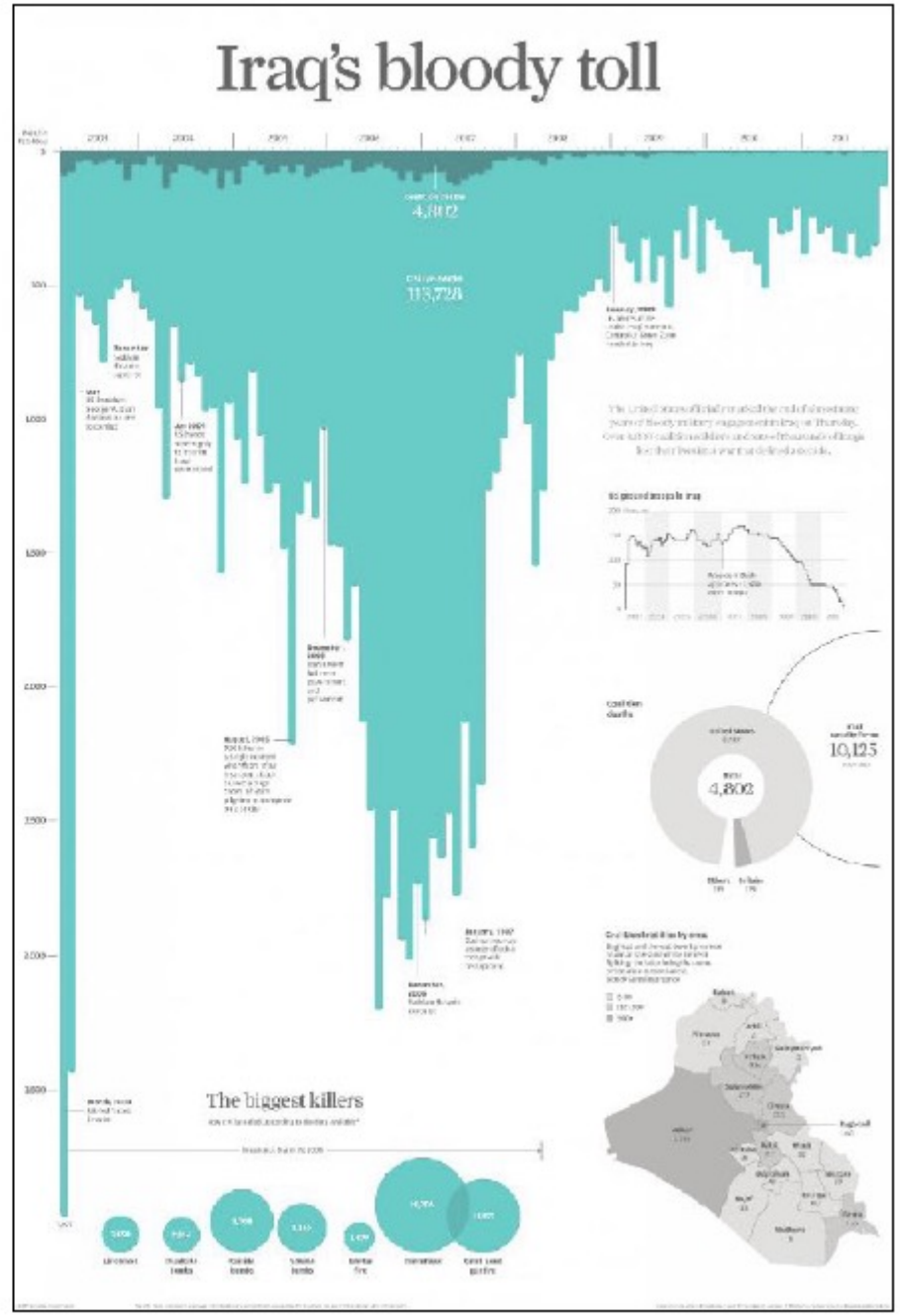
` Êł †// ÆÊ/Êž^ · ÆŁ/π· †^π^ÕÀ‡

+žØ≥ ÆÊ/Êž^IV/Ø‡≥ ΔÕ¤±≥/¾Û^Ê≥žÆ

_ Ø‡≥ Àžfl †‡ Ûπ^ÆŒÛ¡Ø‡±

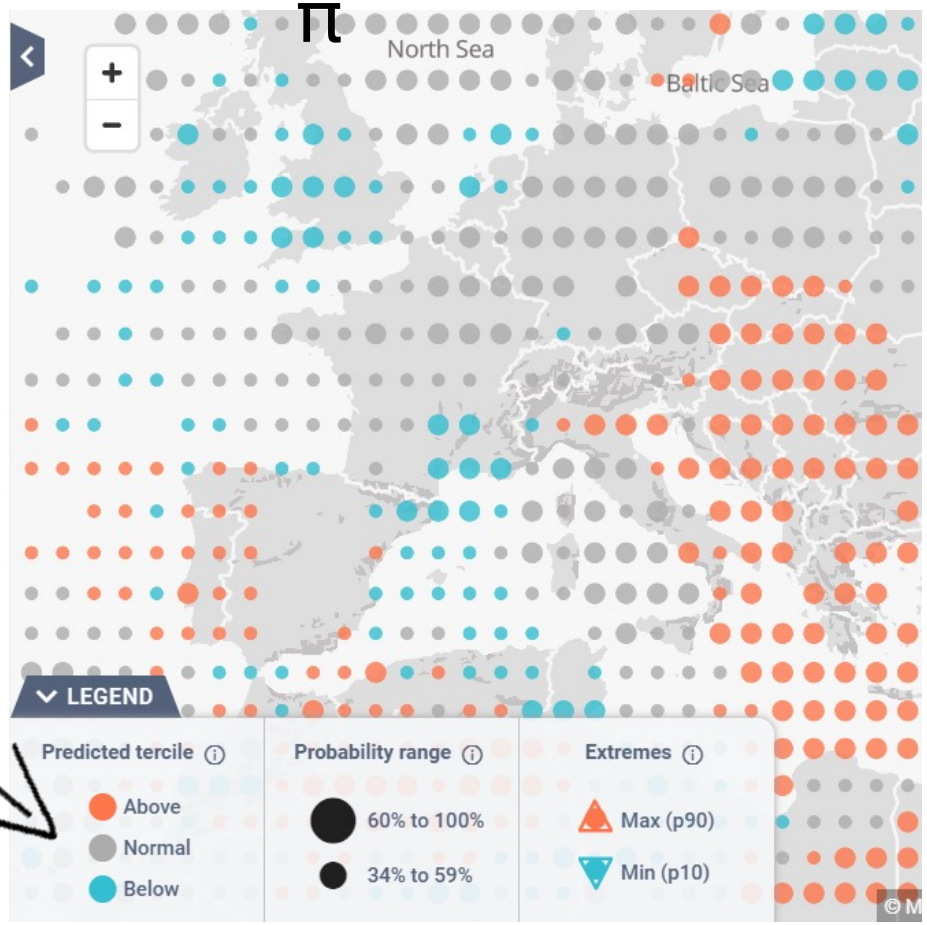
zπfl †‡łÕŒ ÊΔÆÊ/Êž^ fl †łłπ^


Iraq's bloody toll
4,802
113,728
10,125
4,802
The biggest killers


Iraq's bloody toll
4,802
113,728
10,125
4,802
The biggest killers

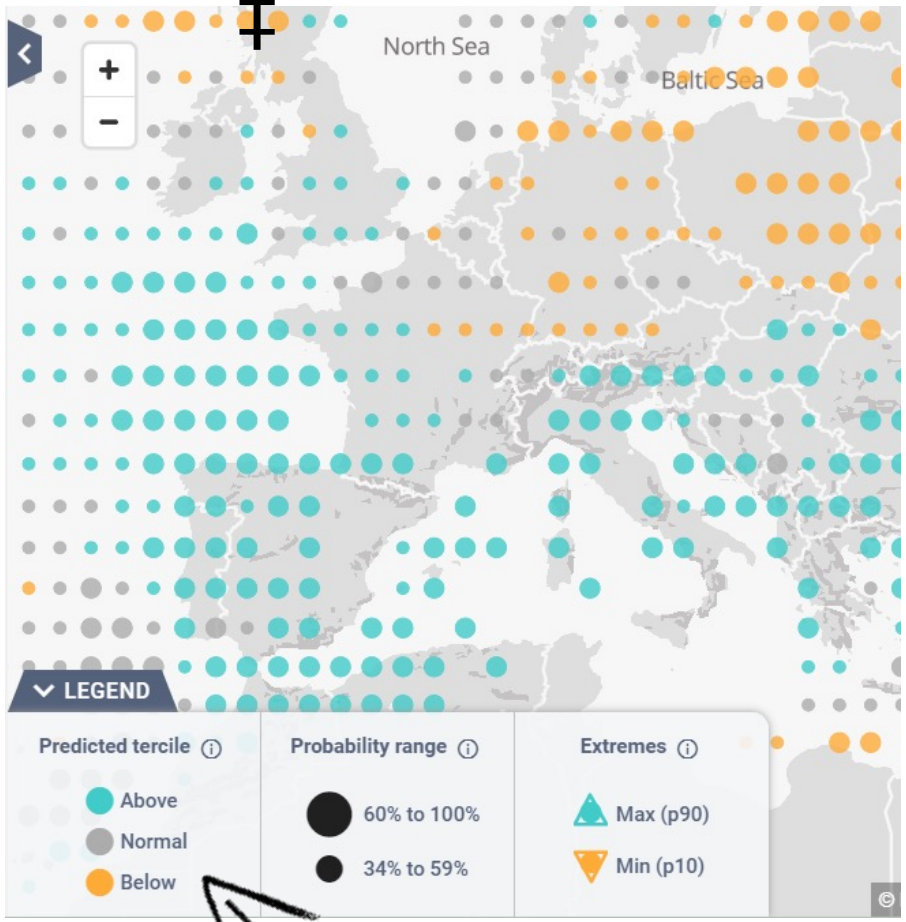
Çπfl Ûπˆ†łž

ˆπ



sˆπÆÕÕÕ†łŒ

‡



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S2S4E
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½½½≠ ¹ ΠŦŽ∫ ≥



- ≠2π· Õ‹‡
- ≠Ü· π^IV π‡ł^ÕÆ≥π· Õ‹‡
- ≠í ÕžŧÆÊ≥Õ«
- ≠- Ê⁄Êž^
- ≠Ü‡ÆŒ^ł†Õłł¾
- ≠Młł π^†ÆÕ« ½ÕÀ
- Õ«Æ^fl †łÕ‡
- ≠Çπ^fl Õ«Ê⁄Ê«¾
- ≠Z†‡«ž†«π

Ü‡ÆÊ‰ˆł†Õ‡ł¾³ Õž†/Õ†ł‡Ê‡ Õ †◊π¾
ÆÀ†//π‡«π ÆÊˆ 2†ł† ³ Õž†/Õ†ł‡Ê‡ †‡≥
z ÆÕ‡ÆÊ‰

EÕ¨ł Ê^≥π^ ž‡Æ¤^ł†Ø¶ł¾

π≠«≤ Û˜Ê¨†¨ ØØG

†‡Êfl †/Ø¤

ł π^ ÆØπ

†³π^†«π†‡≥

ÛÊ¨˙Õ/π

^†‡«π

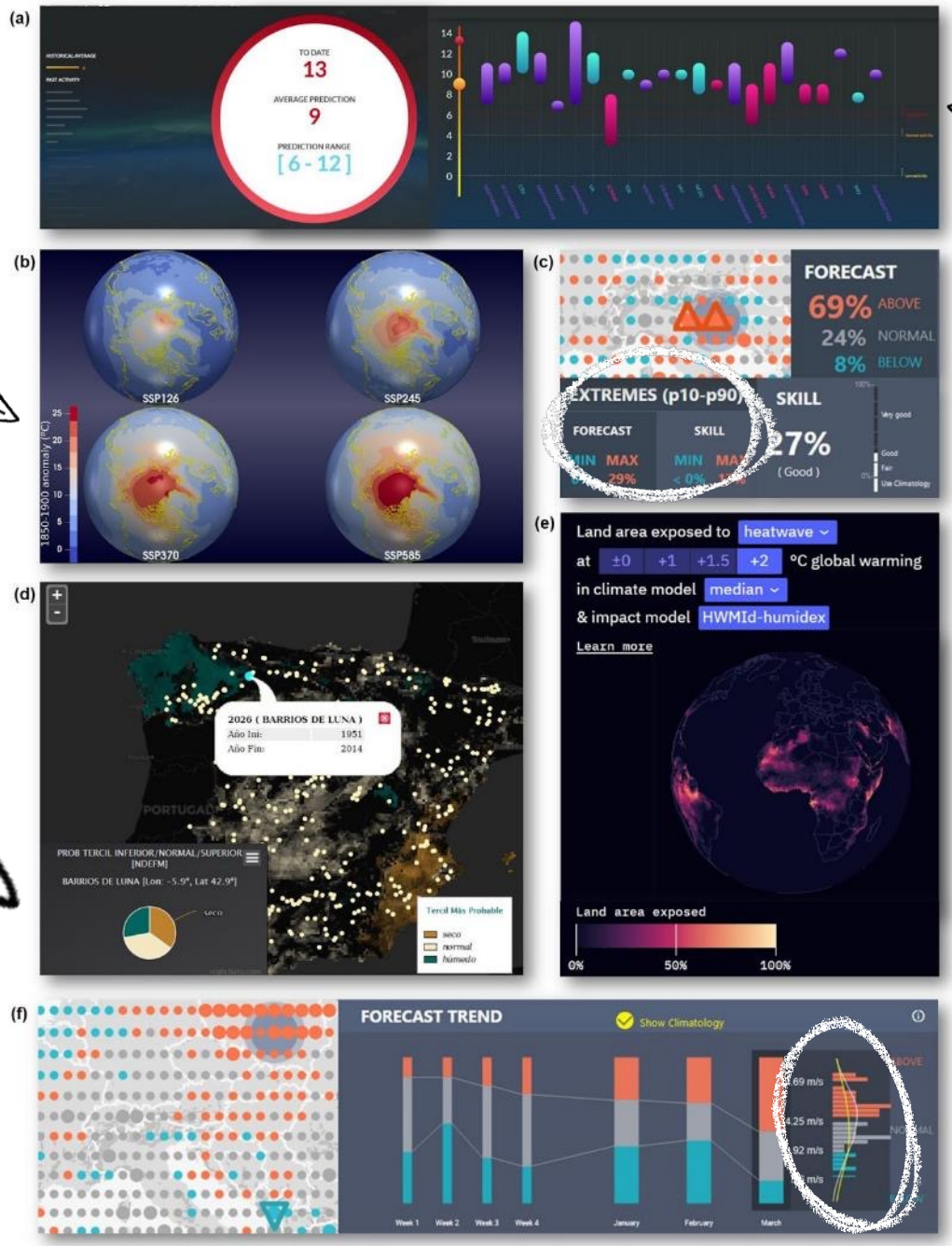
π¼^πfl π

π³π‡ł˙

Û˜Ê¨†¨ ØØG¤˙

°Fπ≠«≠Ù¸ †‡≥

Ù¸ÆŒ¶†^ØÊ¨



Çπ^^†≥Ê _ ≠πł †/≠

½½½≠ÆŒ† †łπž^ÊÛπ≠ž

½ÀÊ/π

Û˜Ê¨†¨ ØØ¾

≥Õł^Õžł¤‡

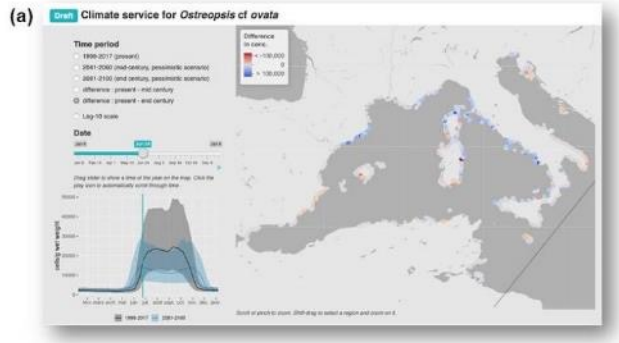
Æž‡ÆŒ¤‡

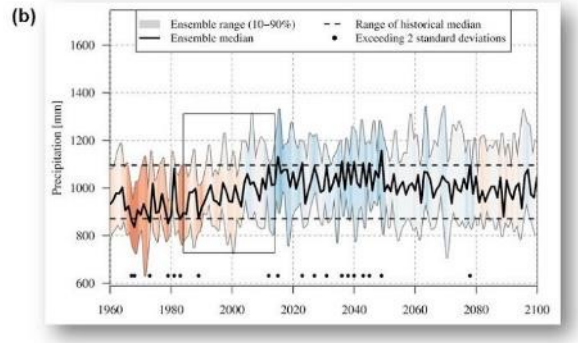
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z πÆÊ‡≥ Ê^ ≥π^ ž‡ÆŒ^ł†ÕĮł¾ · ◊Ø′

Çπ^^†≥Ê′ _ ≠πł †/≠
½½½≠ÆŒĮ †łπž^ÊÛπ≠πž

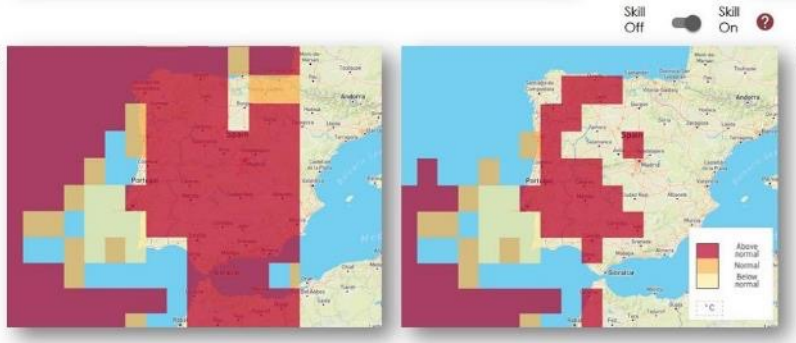
ž‡ÆŒ^ł†ÕĮł
¾‡Êł
· ÀÊ½‡





· ÀÊ½
π‡· π¶l ¨/π
^†‡«π

fl †· ◊ †^π†·
½ÕÀ ÀÕÀ
ž‡ÆŒ^ł†ÕĮł¾





ž· π³Õž†/
π‡ÆÊ≥ÕĮ«
°Fπ≠«≠
ł^†‡· Ûł^π‡Æ
¾K





^πÛ†ÆŒ Ûπ≥ÕÆŒ‡· ½ÕÀ ÀÕÀ ž‡ÆŒ^ł†ÕĮł¾¨ ¾
łÀπ ÆŒĮ †łÊ/Ê«¾°Õπ≠†³π^†«π ÆÊ‡≥ÕŒ‡· ÊΔłÀπ

ž· π ÕĮłπ^†ÆÊÕπ ÊÛłŒ‡· °Fπ≠«≠
·/Õ≥π^K



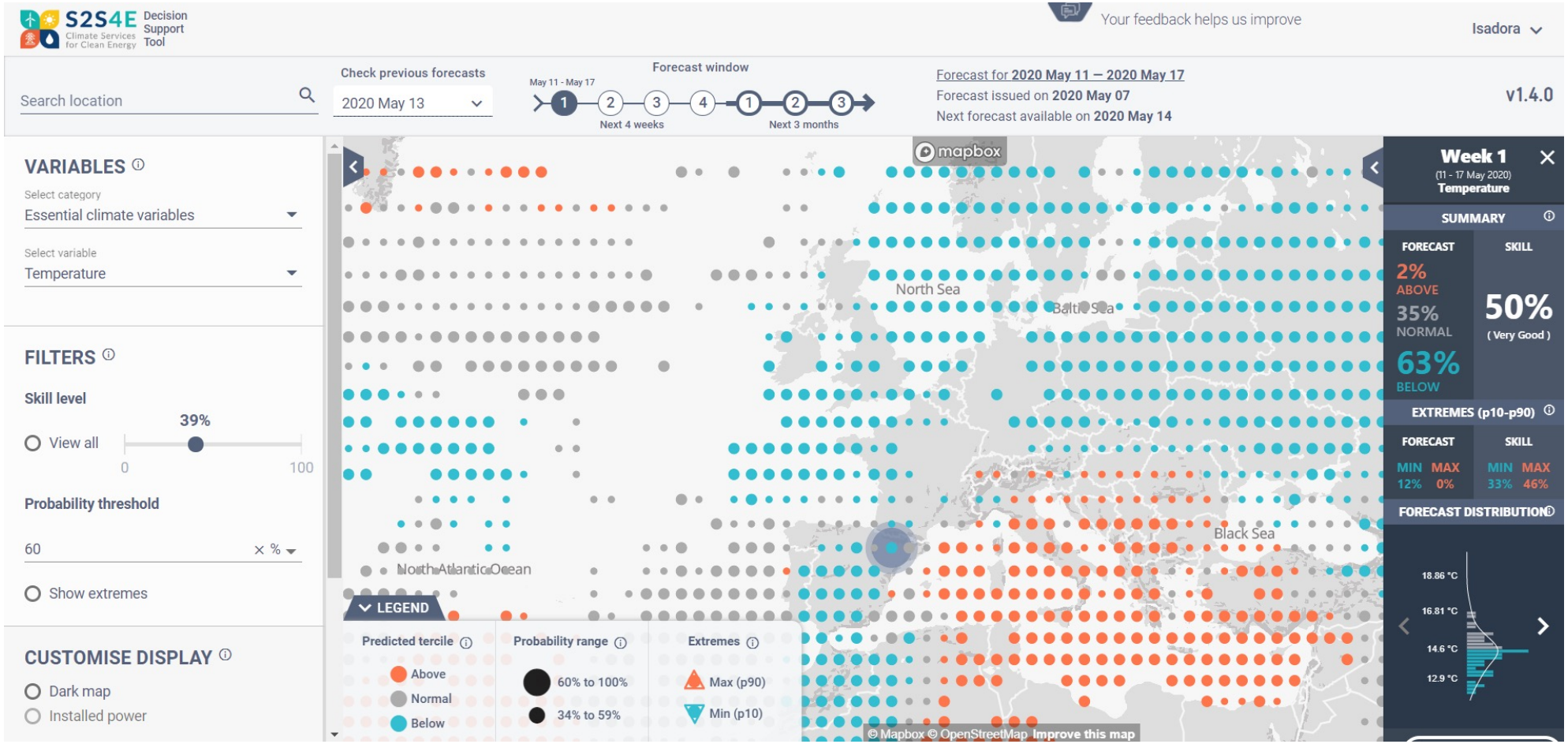
› ≠2π· Õ‹‡
a ≠Ü· π^IV π‡ł^ÕÆ≥π· Õ‹‡
e ≠í ÕŽ†/ π‡ÆÊ≥Õ‡«
i ≠- Ê⁄ÊŽ^
o ≠Ü‡ÆŒ^ł†Õ‡ł¾
u ≠M‡łπ^†ÆÕ‡« ½ÕÀ
Õ‡Æ^fl †łÕ‡
c ≠Çπ^fl Õ‡Ê⁄Ê«¾
d ≠Z†‡«Ž†«π

Ç½Ê ◊π¾ÆÊ‡ÆÊÛ·



s^Ê«^π·· Ø3π
2ÕÆÆÊ·ž^π

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Ç½Ê ◊π¾ÆÊ‡ÆŒÛ·



s ˆ Ê« ˆ π· · Ø π

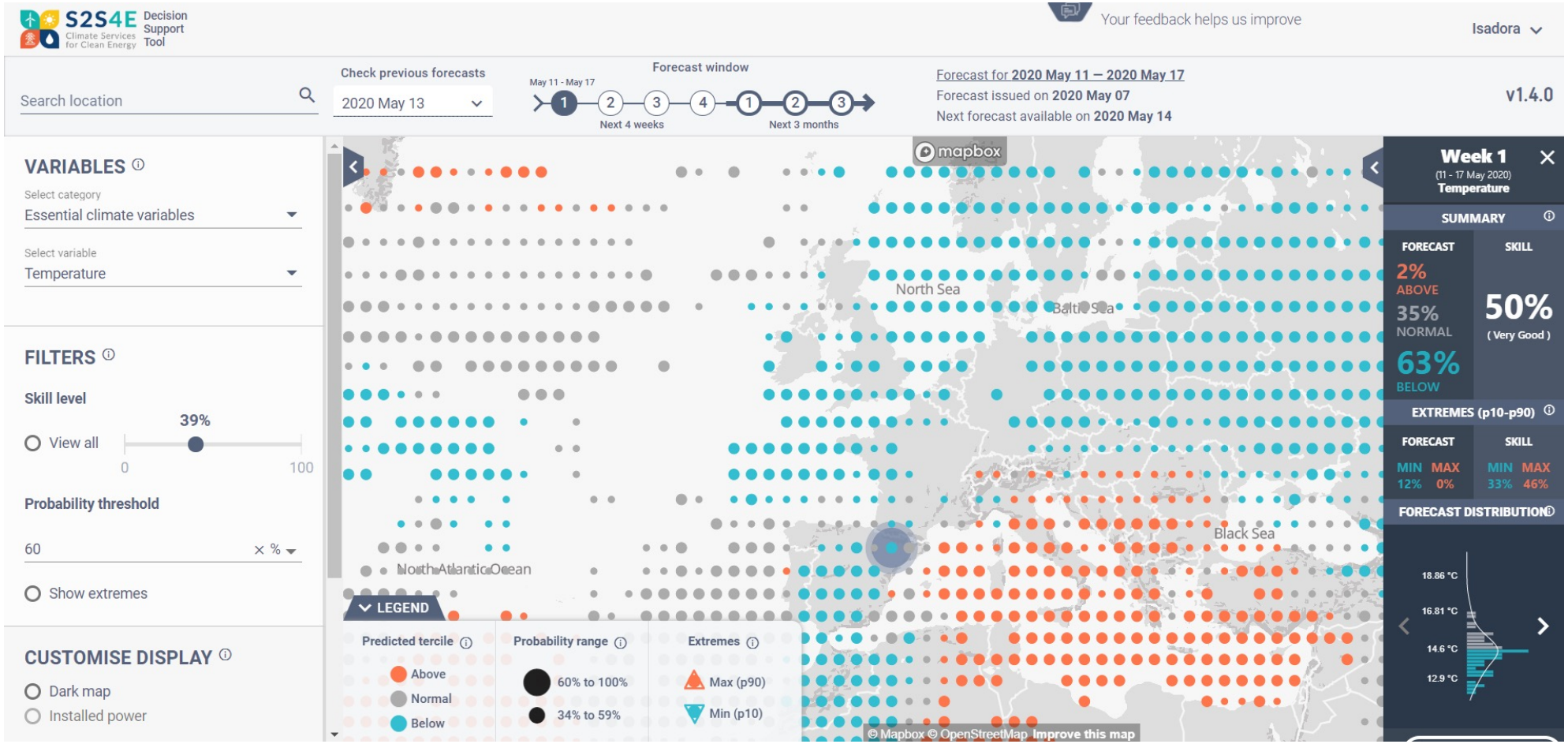
2 Õ ÆÆÊ· ž ˆ π

f Δ Œ ŒÆ ˆ fl †ł Œ Ê‡

M‡ł π ˆ †ÆÆÕ π

2 π· Õ ‹ ‡

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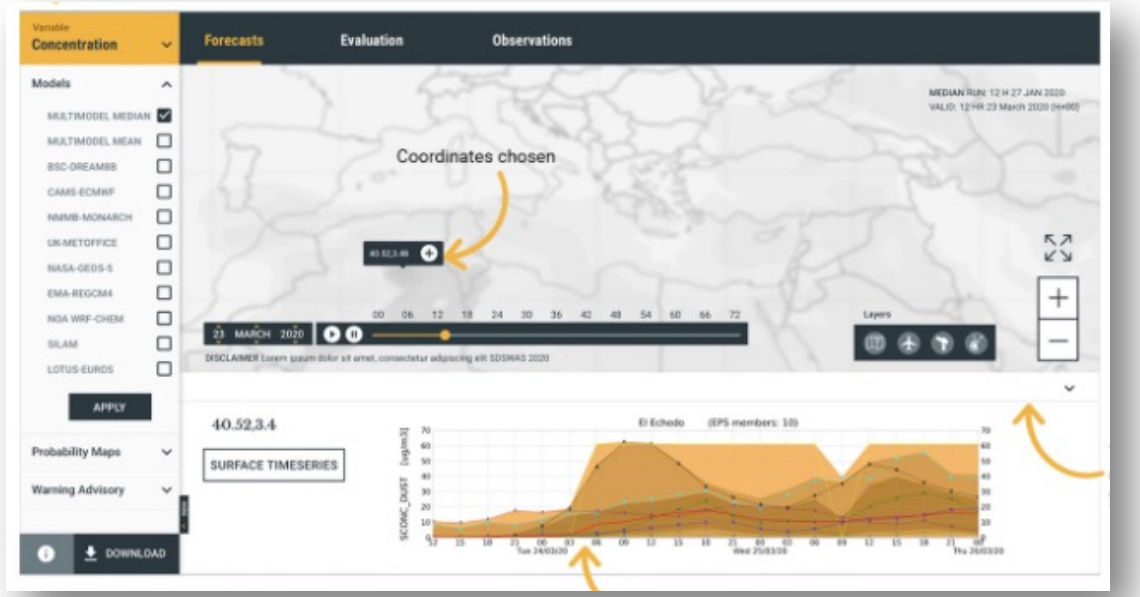


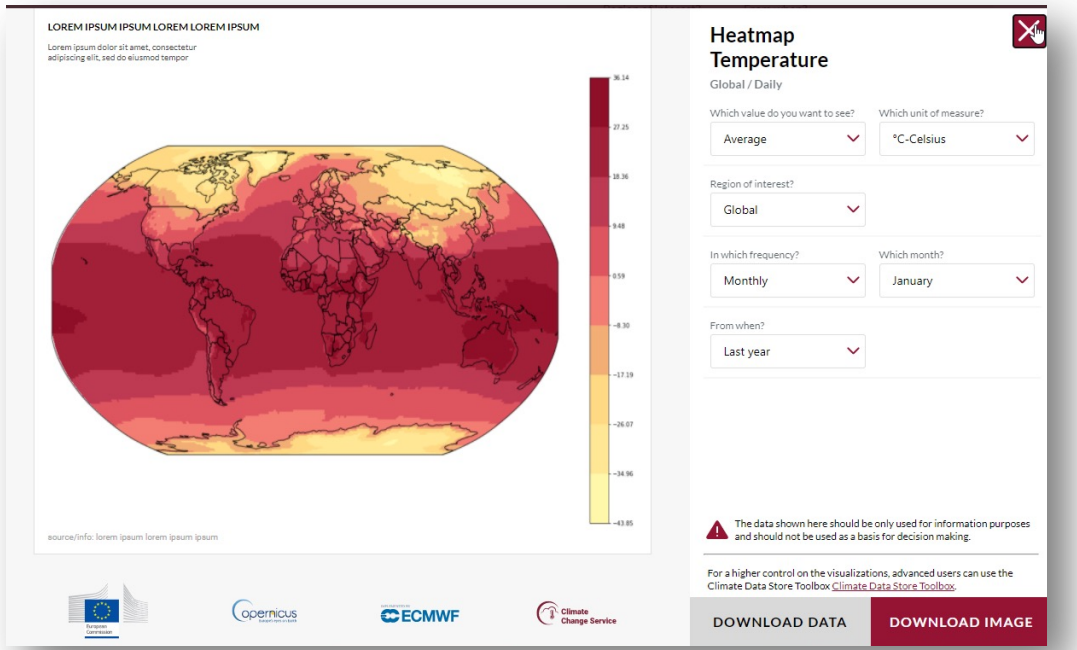
› ≠2π· Õ«‡
a ≠Ü· π^lV π‡ł^ÕÆ≥π· Õ«‡
e ≠í ÕŽ†/ π‡ÆÊ≥Õ‡«
i ≠- Ê⁄ÊŽ^
o ≠Ü‡Æ˚^ł†Õ‡ł¾
u ≠M‡łπ^†ÆÕ‡« ½Õ‡À
Õ‡Æ˚^fl †łÕ‡
c ≠Ç‡π^fl Õ‡Ê⁄Ê«¾
d ≠Z†‡«Ž†«π

ǂ≥ ÊǂÆ¾Êž ÆÕÀ½ÕÀ
ǂ// ³Õžǂ/ ·łžÆ ≠

〃 ¾Êž ·łØ Àǂ³πłÊ≥πǂ/
½ÕÀ ǂ// ÇßñÇÕ łÀπ
Û Ê≥žÆ

// XÆÊÛ¾XQ ł À¤³ Õž†/Õ†łÕÊ‡ Û ÊžÆ

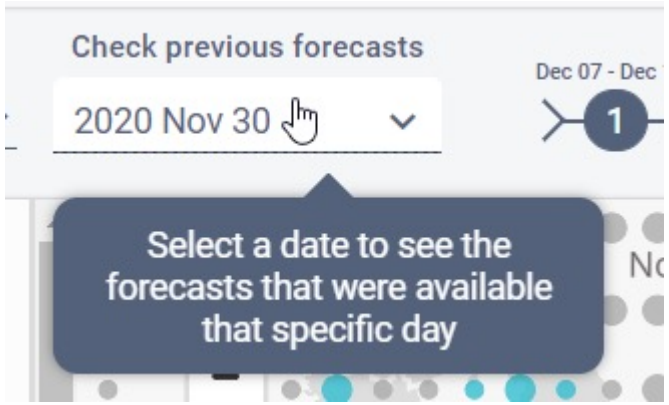




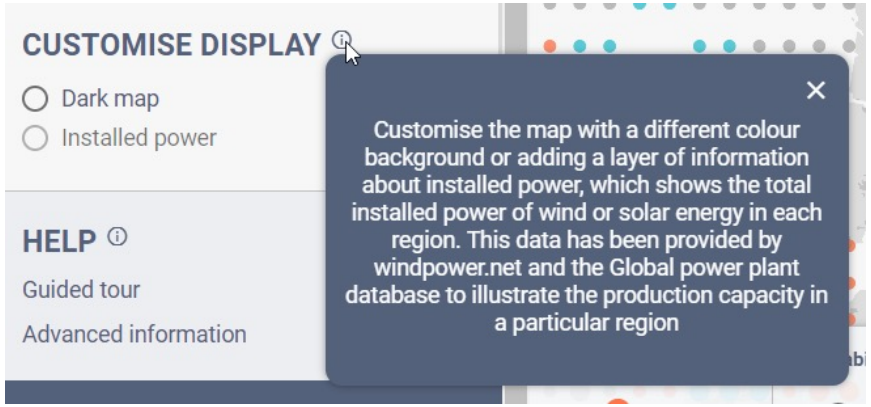
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GžÕ≥Õ¶« łÀп Ü· п^

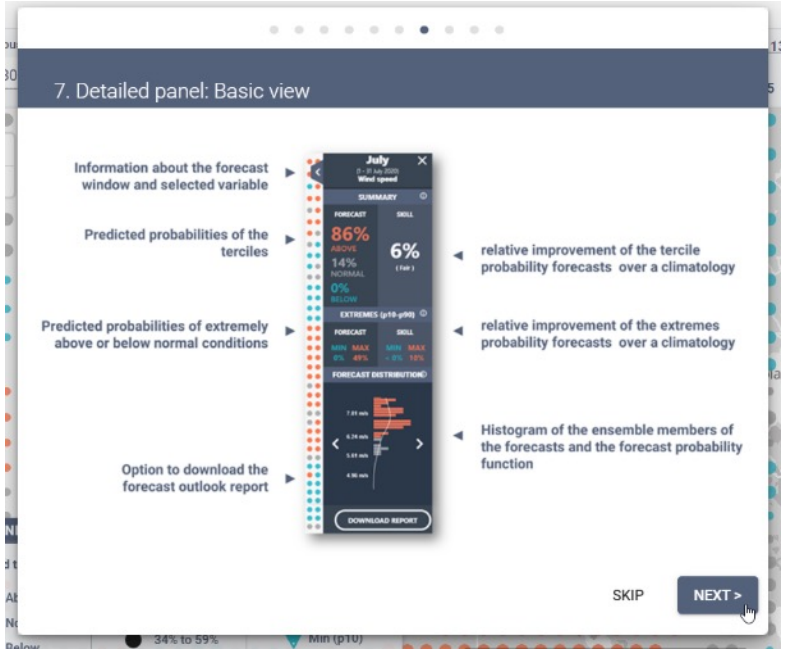
_ Êž· п ÀÊ³ п^ łп¼



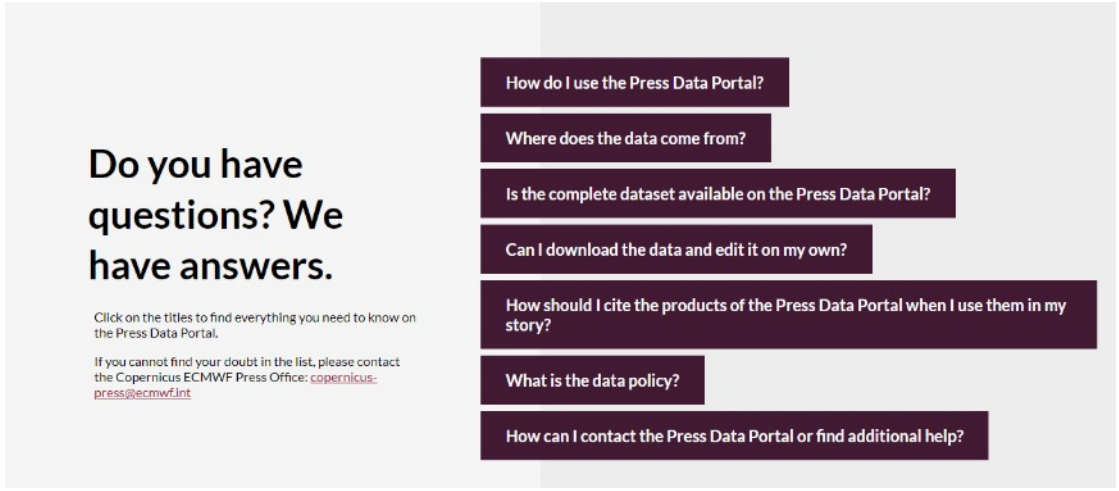
ÇÊÊ⁄łÕÜ



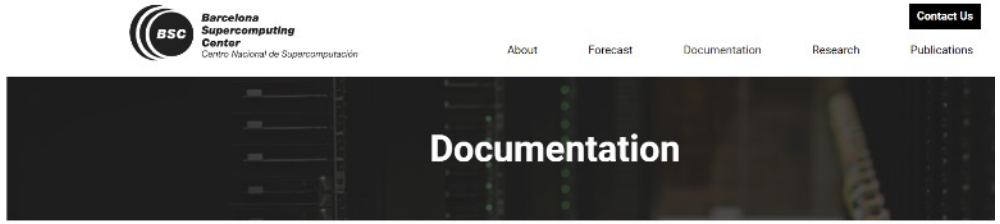
GžÕ≥п≥łÊž^·



E u



≥³ †‡ÆÆ≥ Àп⁄Û †‡≥ ≥ÊÆŽfl пŧł†ł◊Ê‡



Decadal Predictions

The evolution of the climate systems in the near future depends on changes in atmospheric composition and other external forcings as well as in the slow naturally generated internal climate variability. Until very recently, the only sources of future climate information that were available to interested users were seasonal predictions and climate projections. The former provide a future outlook of the earth's climate system for a period ranging from 1 to 18 months into the future while the latter covers a continuous temporal range from the past century to the end of this century (or beyond) but with no relationship with the contemporaneous internal climate variability. At the seasonal timescale, the climate evolution mainly depends on the internally generated variabilities of the climate system and less on the changes in the externally forced components that occur over the period of forecast. On the other hand, climate projections are solely driven by changes in external forcings without constraints on the internal variability.

+†ÆŒ«ˆÊž‡≥ †‡≥ ÆÊ‡ł¼
ÕŒ/Œˆfl †ł◊Œ‡ †¨ Êžł łÀ¤ Ûˆ Ê≥žÆŒ

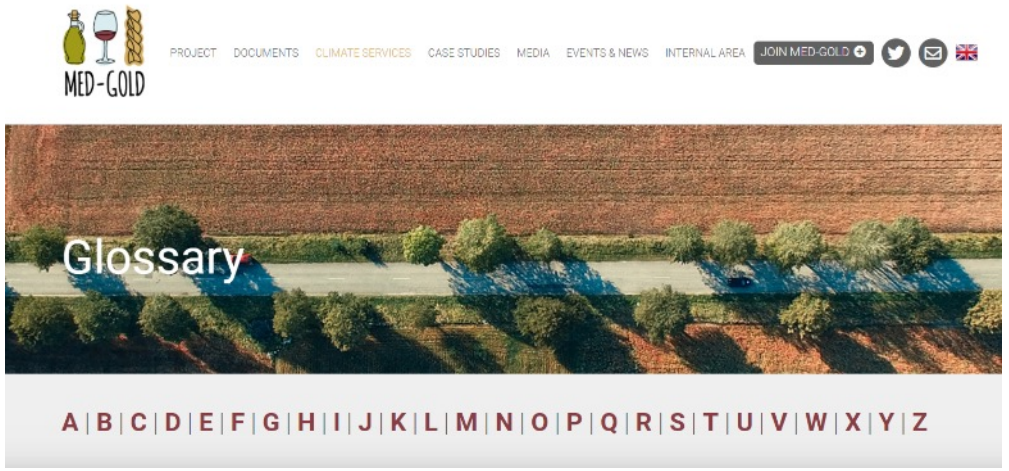
E†ÆŒ ÀπœŁ



- †¨π¨łž≥Õ¤¨



G⁄Ê¨ ¨†ˆÕ¤





› ≠2π· Õ‹‡

a ≠Ü· π^IV π‡ł^ÕÆ≥π· Õ‹‡

e ≠í ÕŽ†/ π‡ÆÊ≥Õ‡«

i ≠- Ê⁄ÊŽ^

o ≠Ü‡ÆŒ^ł†Õ‡ł¾

u ≠Mł‡π^†ÆÕ‡« ½Õ‡À

Õ‡Æ^fl †ł‡Õ‡

c ≠Ç‡π^fl Õ‡Ê⁄Ê«¾

d ≠Z†‡«Ž†«π



v π«ŒÊ‡†/ ÛˆÊ≥žÆ

3 ·

M4ł π^ ‡†ł ŒÊ‡†/

ÛˆÊ≥žÆ

v π⁄π³ †‡ł ÛˆÊ≥žÆ

Ê‡/¾Œ 8‡«/ÕÀ

Õ †‡Ê‡IŒÆž· Õπ

Ü· π^IWt ÕÊ^ π≥
Û^Ê≥žÆ ‡ππ≥ †
Ç^†‡· ≥ÕÆŒÙÕ‡†^¾
†ÛÛ^Êt Æ

ÇK `W
óf Ü

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EXCELENCIA SEVERO OCHOA

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M†≥Ê^† - À≠VŒ ∫ ‡πi
ǴÕ†≥Ê^†ÆÀ^Õł π⁄

Isadora.jimenez@bsc.es

WEBINAR

10 MARCH 2021
15:00 - 16:00 CET

DUST IMPACTS ON OCEANS

Nicholas Middleton
University of Oxford

inDust

cost
EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY

