

CCI Visualisation Corner

**Philip Eales, Kevin Tildsley, Andrew Wayne,
Tim Day, Mona Craven, Fulvio Marelli**
Planetary Visions Limited

Cat Downy, Pascal Lecomte
European Space Agency ESA-ECSAT



CCI Visualisation Corner

Objective

Prototype Phase

- Create an interactive visualisation of CCI data sets to introduce the CCI programme, show and explore some of the CCI data sets, and compare one data set with another.
- Aimed at a technical audience familiar with Earth observation data.

Production Phase

- Expand to include the full set of Essential Climate Variables.
- For public relations and educational purposes.

CCI Visualisation Corner



Exhibition
Version

CCI Visualisation Tool



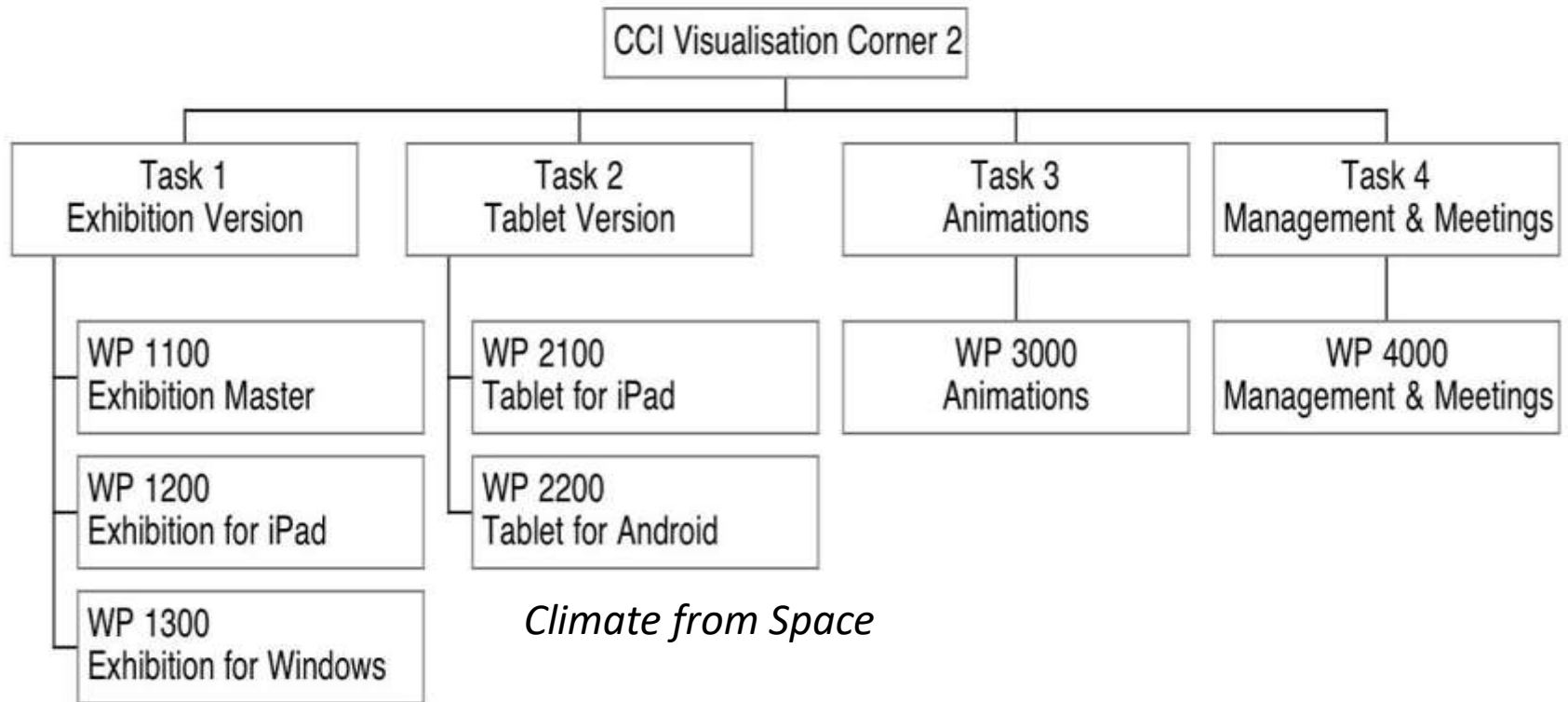
Animations



Tablet
Version

Climate from Space

CCI Visualisation Corner



Climate from Space

CCI Visualisation Tool

CCI Visualisation Corner

Audience

Task 1 Exhibition Version

- non-expert scientists, project managers, decision makers
- scientific conferences and intergovernmental meetings
- presentation mediated by an expert

Task 2 Tablet Version

- general public, across Europe, English speaking, educated, interested
- Apple and Android app stores
- self-drive digital book

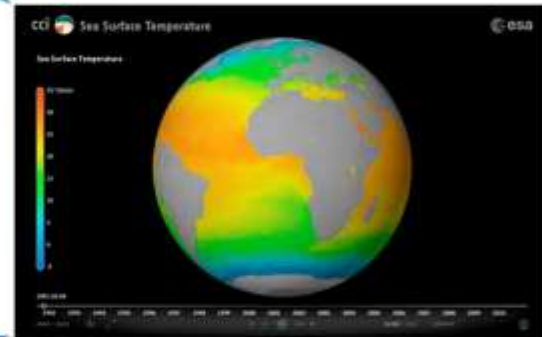
Task 3 Animations

- general public, news editors, television programme makers
- ESA website, online media, tv news and press

CCI Visualisation Corner Software Development



Exhibition Version (Mac, Windows, iPad)
QML, HTML



Data Viewer
C++
OpenGL



Tablet Version (iPad, Android)
QML, HTML, JavaScript

linux
Qt 5.9, XCode 8

CCI Visualisation Corner

TASK 2 Tablet Version

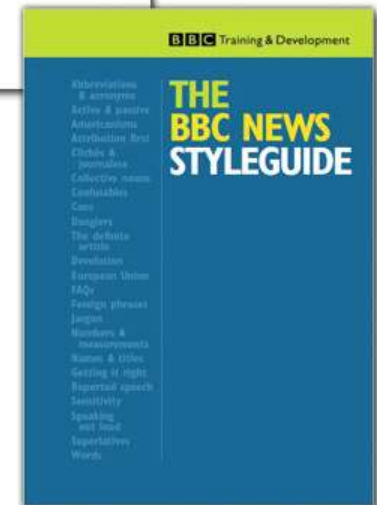
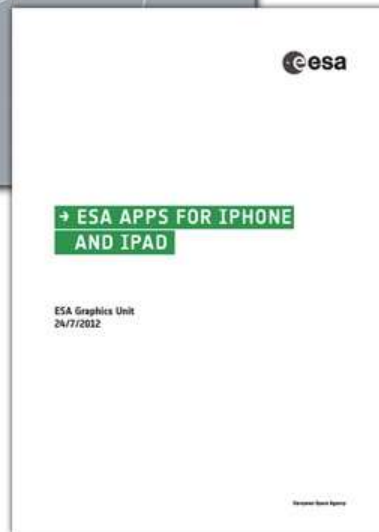
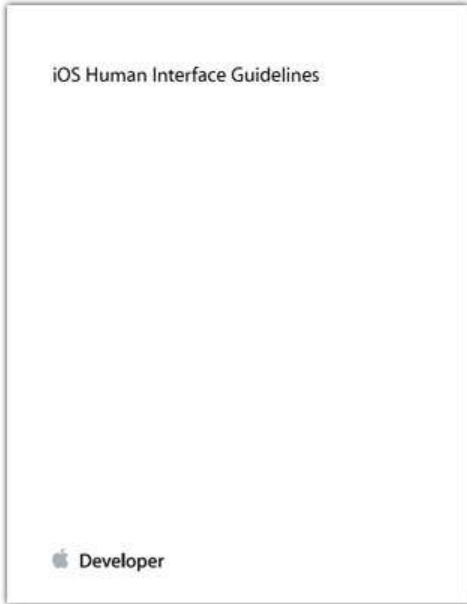
Prior Art



CCI Visualisation Corner

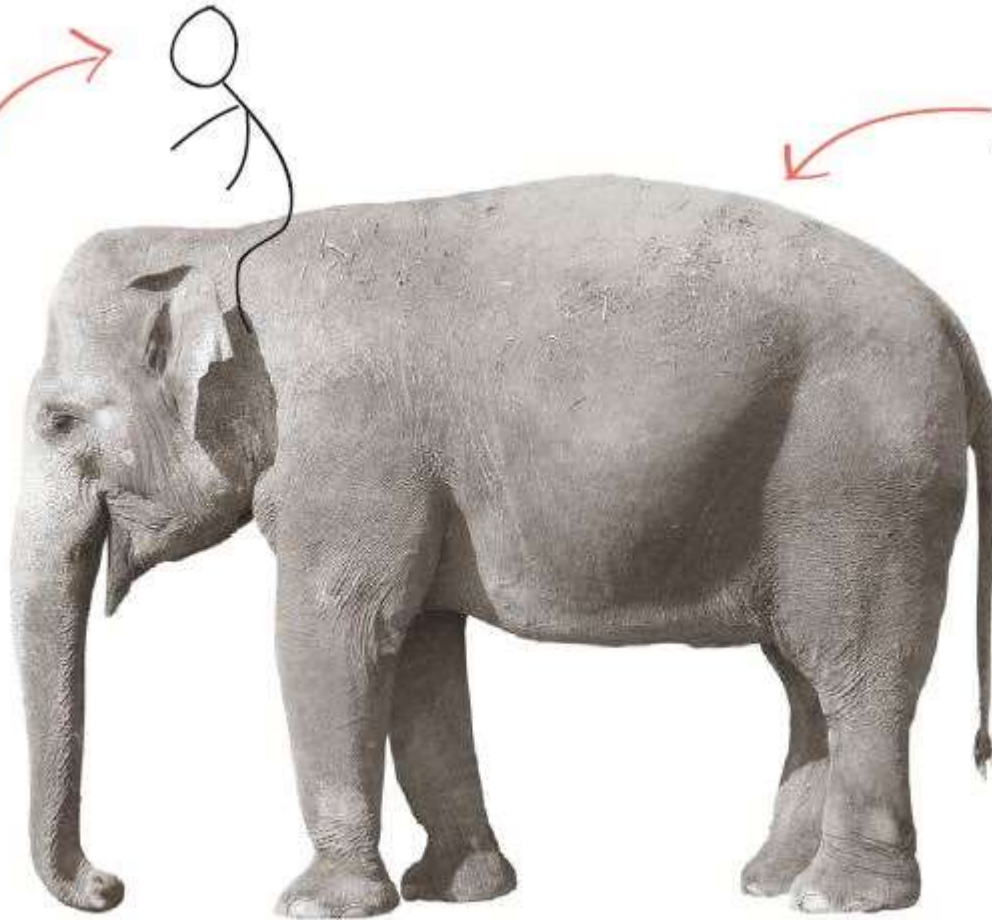
TASK 2 Tablet Version

Style Guides



Presenting the Unfamiliar

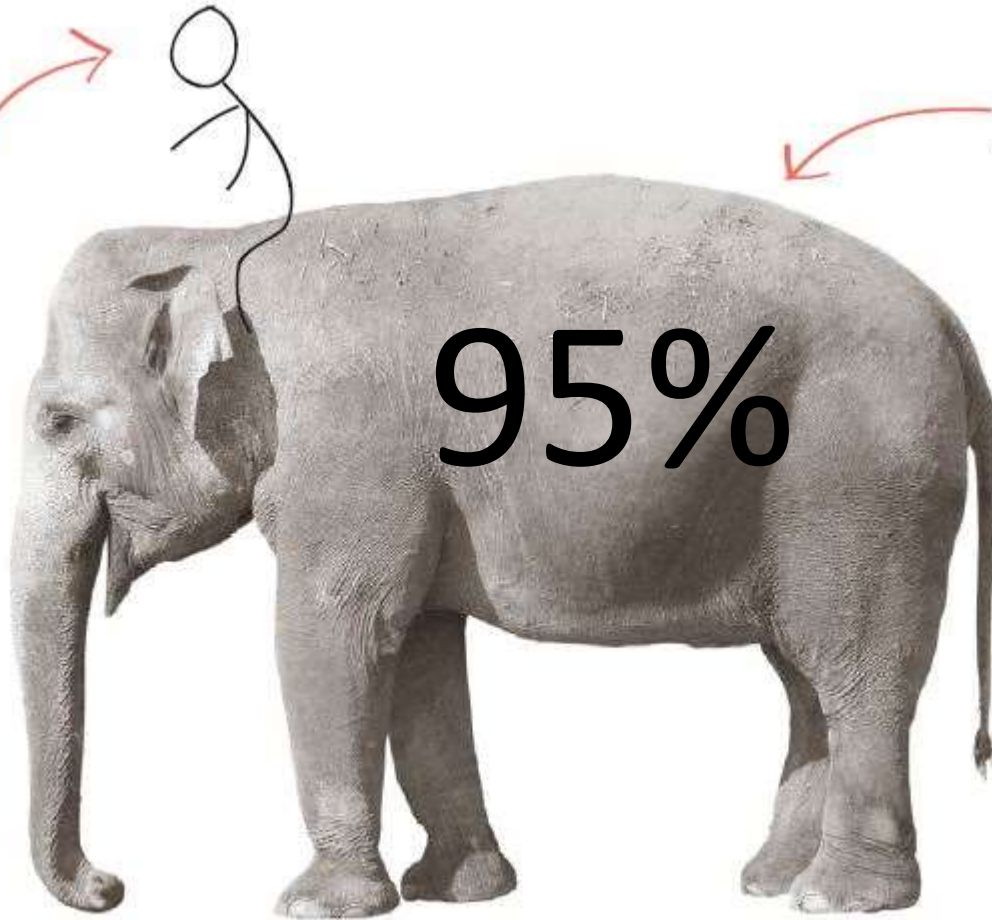
Rider:
The
conscious,
verbal,
thinking
brain



Elephant:
The automatic,
emotional,
visceral
brain

Presenting the Unfamiliar

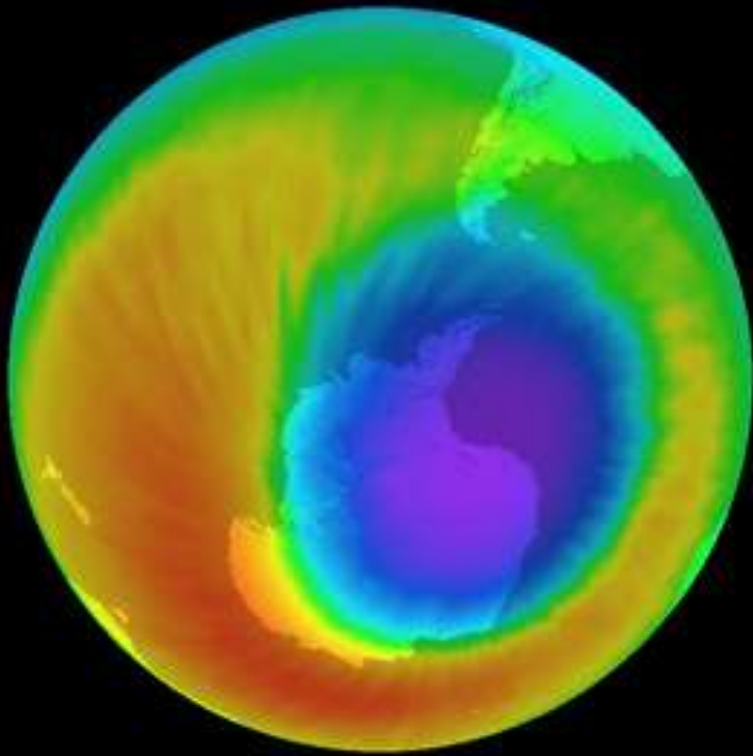
Rider:
The
conscious,
verbal,
thinking
brain
5%
of
cognitive
activity



Elephant:
The automatic,
emotional,
visceral
brain

Presenting the Unfamiliar

- **Natural colour** - background maps (meaningful colour for data)
- **3D** - digital terrain, data as height field
- **Realism** - atmosphere, clouds, haze, reflecting water
- **Immersion** - seamless virtual world
- **Data quality** - dropout, coverage, algorithm limits
- **Context** - geographical, scientific, historical
- **Story** - clarity, significance, relevance, connection
- **Integrity** - GIS, digital mapping, data analysis software



precision



spatial structure, motion,
understanding

Understanding Colour Keys

- **proportionate** - colour change proportional to data value change (eg, Brewer's perceptual palettes)
- **monotonic** - constant brightness/saturation, or brightness/saturation increasing with data value (not reversing)
- **unambiguous** - avoid similar colours at opposite ends of the range (eg, red and purple in the common spectrum or rainbow palette)
- **appropriate** - to the characteristics of the data (eg, sequential or divergent?)
- **easily-understood** - meaningful *to the viewer*, intuitive
- **distinct** - from each other for comparisons
- **satisfactory** to the science teams(!)



Spectrum palette



Modified spectrum - sea surface temperature



Spectrum with transparency (or increasing saturation)



Intuitive palette - normalised difference vegetation index

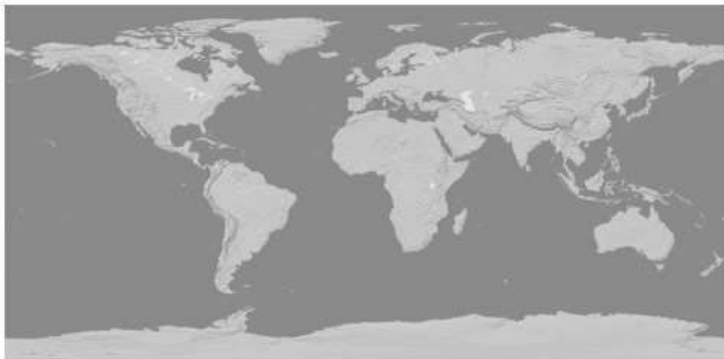


Divergent palette - sea level anomaly (red=positive, blue=negative)



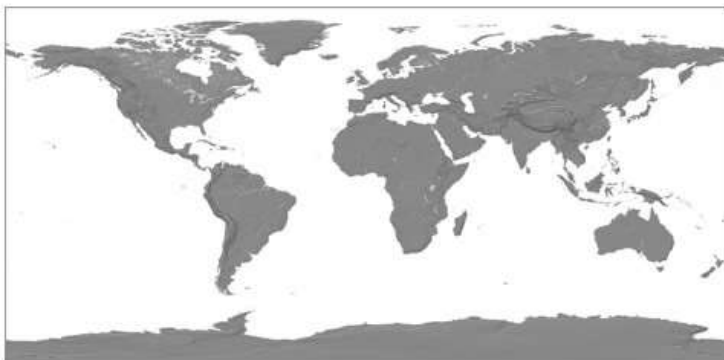
Inverted divergent - soil moisture anomaly (red=dry, blue=wet)

ESA CCI Visualisation Corner Background Maps



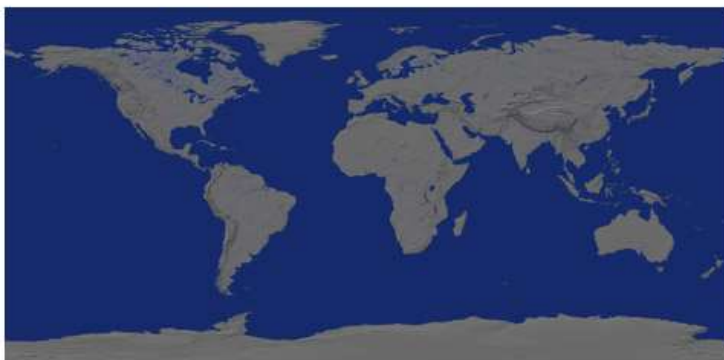
Standard Background

GHG
Aerosol
Ozone
Soil Moisture
Fire
Land Cover
Glaciers
Ice Sheets



Sea Background

Sea Level
SST
Ocean Colour

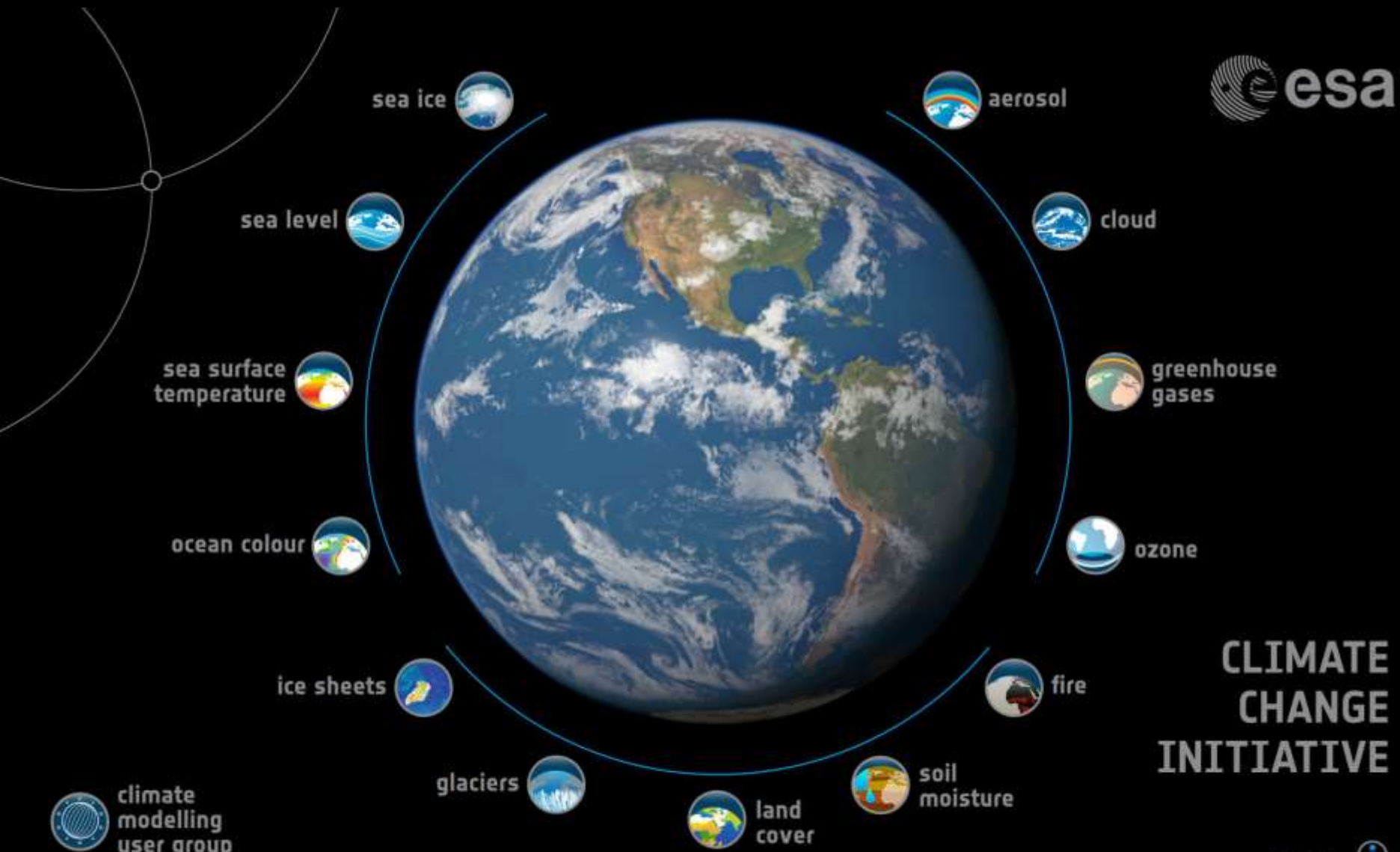


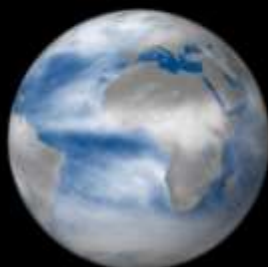
Blue Background

Cloud
Sea Ice

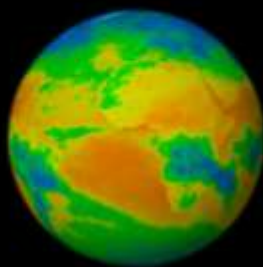
DEMO



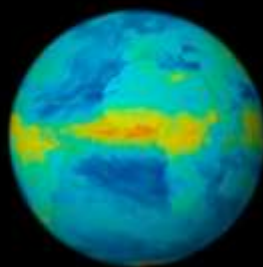




cloud fraction



cloud top temperature



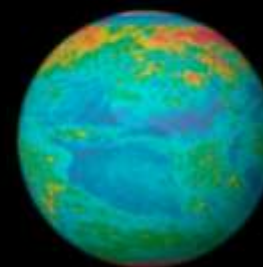
cloud top height



liquid water path



optical thickness



effective radius

Clouds play a key role in the Earth's climate system by amplifying the reflection of incoming solar radiation and damping the outgoing thermal radiation. Quantifying cloud frequency and cloud properties as well as their corresponding impact on radiation improves our understanding of cloud processes, which will contribute to reducing uncertainties due to clouds in climate predictions. Cloud frequency and properties are extremely variable in space and time, making observation and analysis challenging and only feasible with long-term global satellite observations.

20%

of incoming solar radiation is reflected by clouds back into space

-20 W/m²

net cloud radiative effect - a combination of shortwave cooling (-47W/m²) and longwave warming (+27W/m²)

QUANTIFICATION

of cloud amount and properties in climate models continues to be a challenge (source: IPCC AR5, 2013)



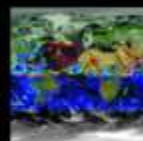
Storm Clouds over the Pacific



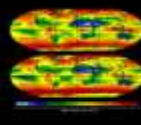
Atmospheric ECVs



Meteorological Satellites



CCI Cloud Results



Total Cloud Cover

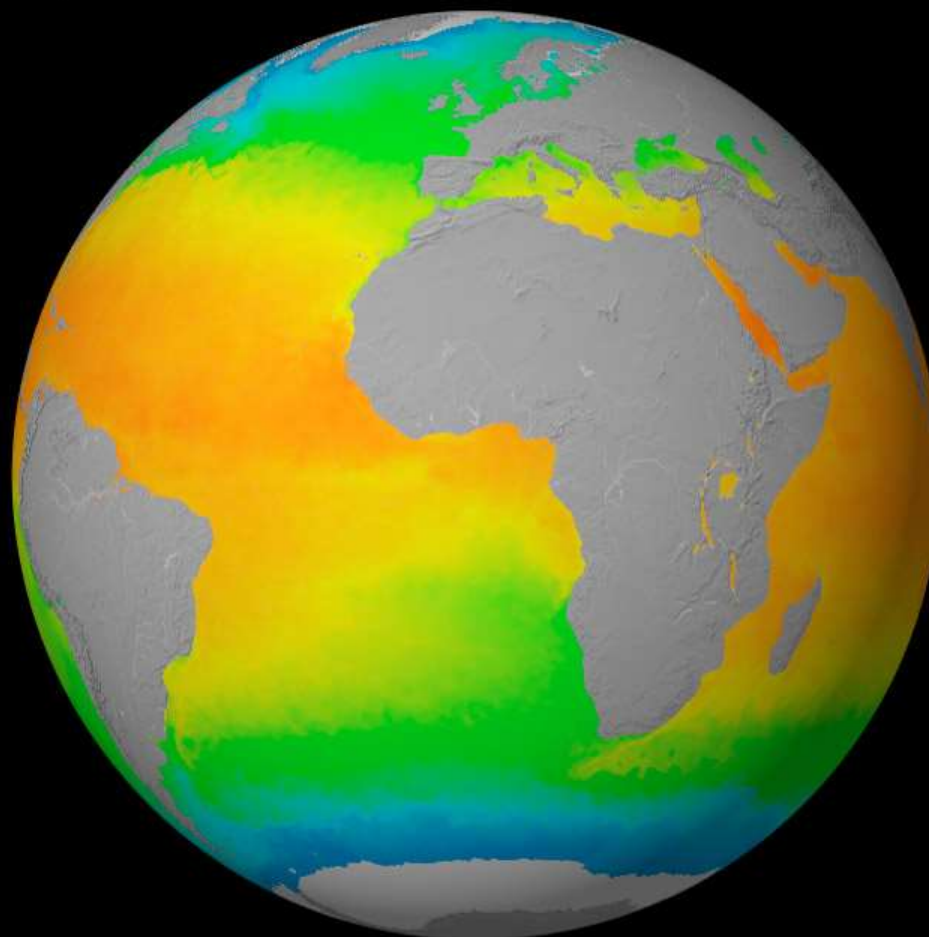


AVHRR FCDR



Project Team

Sea Surface Temperature

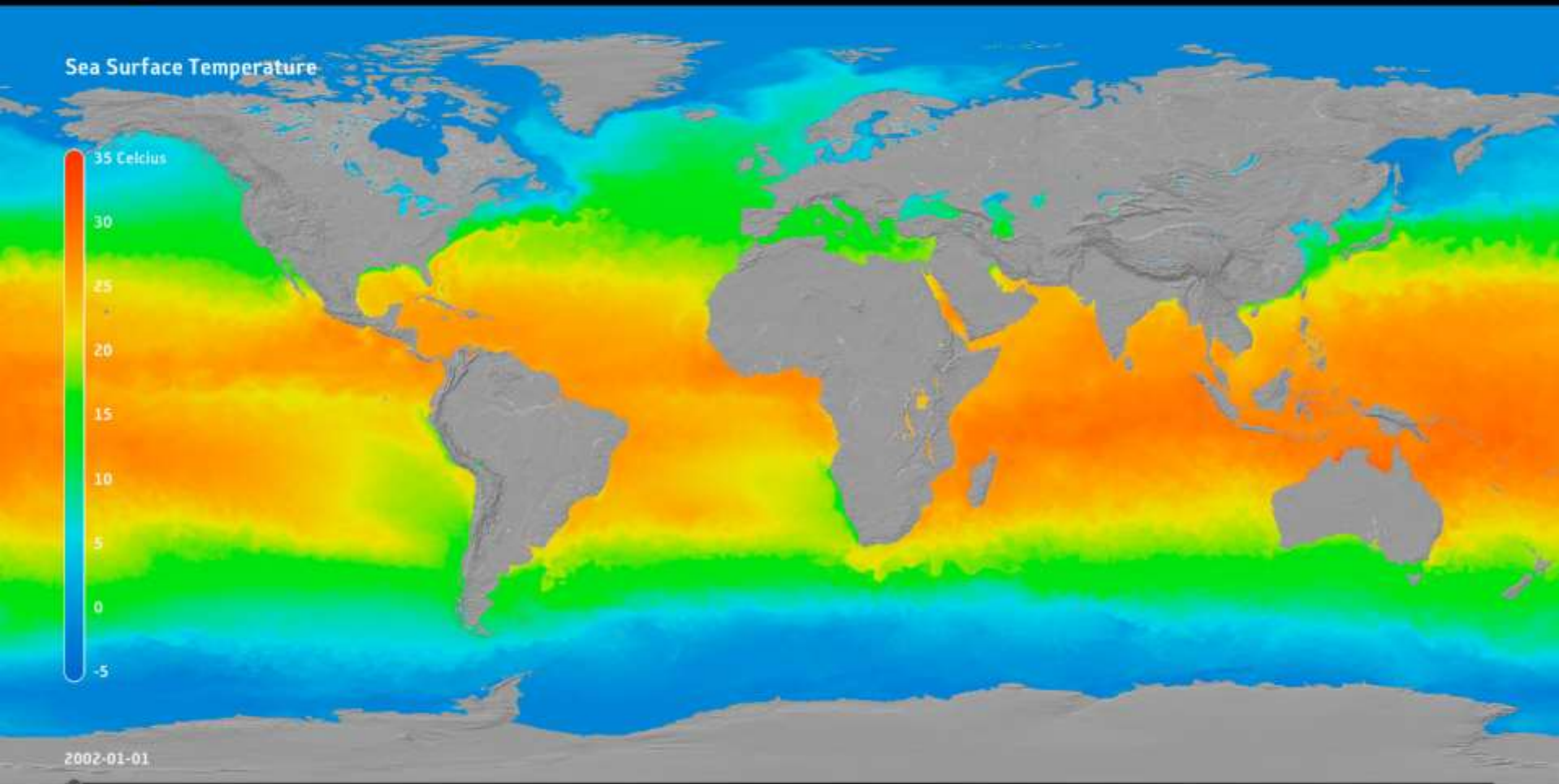


1991-10-28

1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010

HOME | BACK  GLOBE | MAP COMPARE 

Sea Surface Temperature



2002-01-01

2002 2003 2004 2005 2006 2007 2008 2009 2010

Sea Surface Temperature



2002-01-01

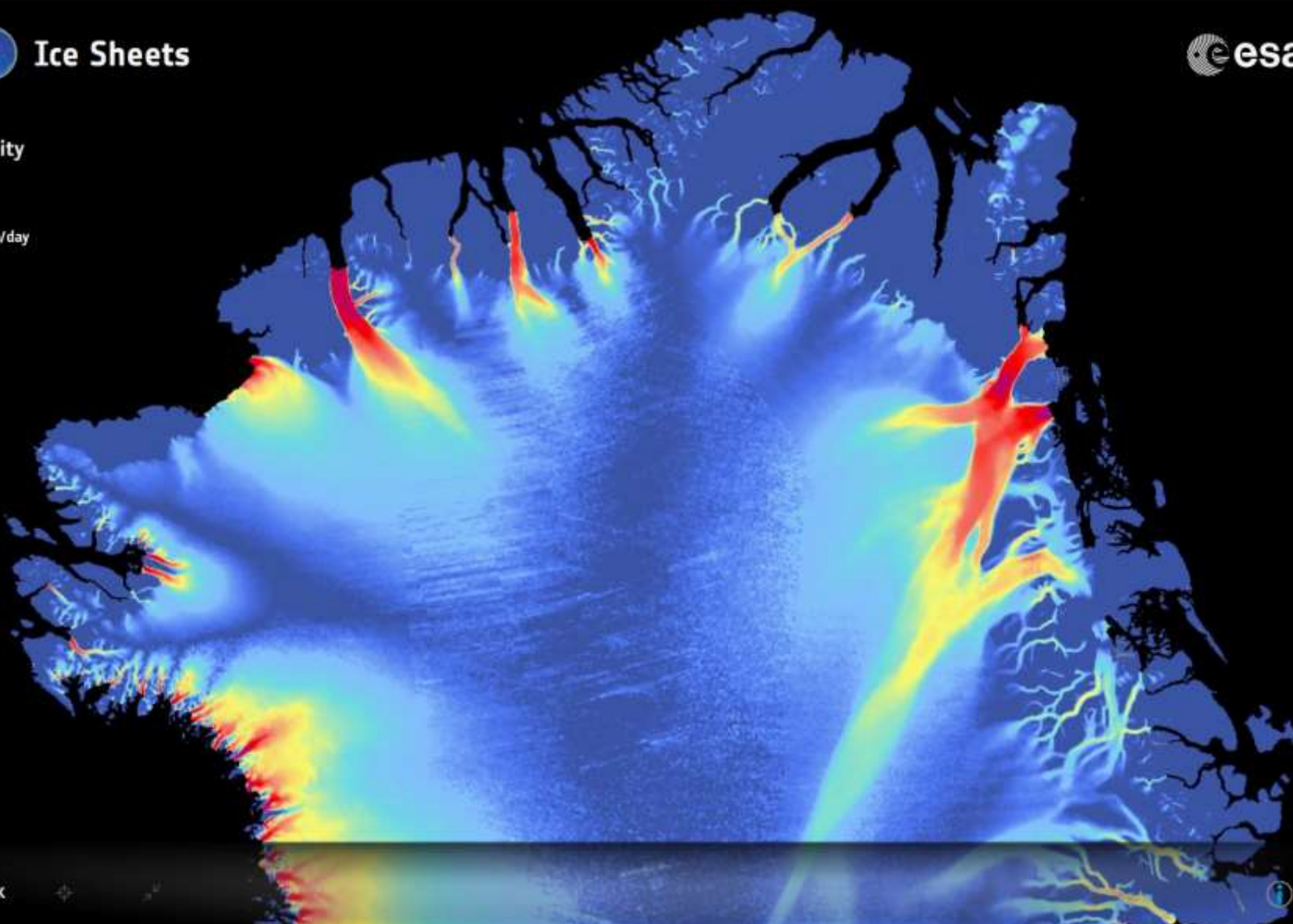
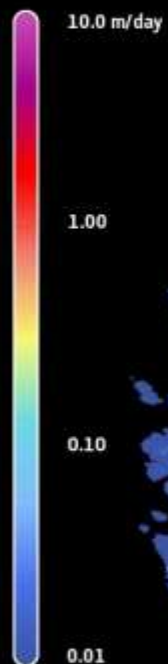
2002 2003 2004 2005 2006 2007 2008 2009 2010

[HOME](#) | [BACK](#)



[GLOBE](#) | [MAP](#) | [COMPARE](#)

Ice Velocity



Ozone Profile
longitude 50° West

40 km

3.0 ppm

2.0

1.0

0.0

20 km

0 km S

2012-10-17 06

Feb

Mar

Apr

May

Jun

Jul

Aug

Sep

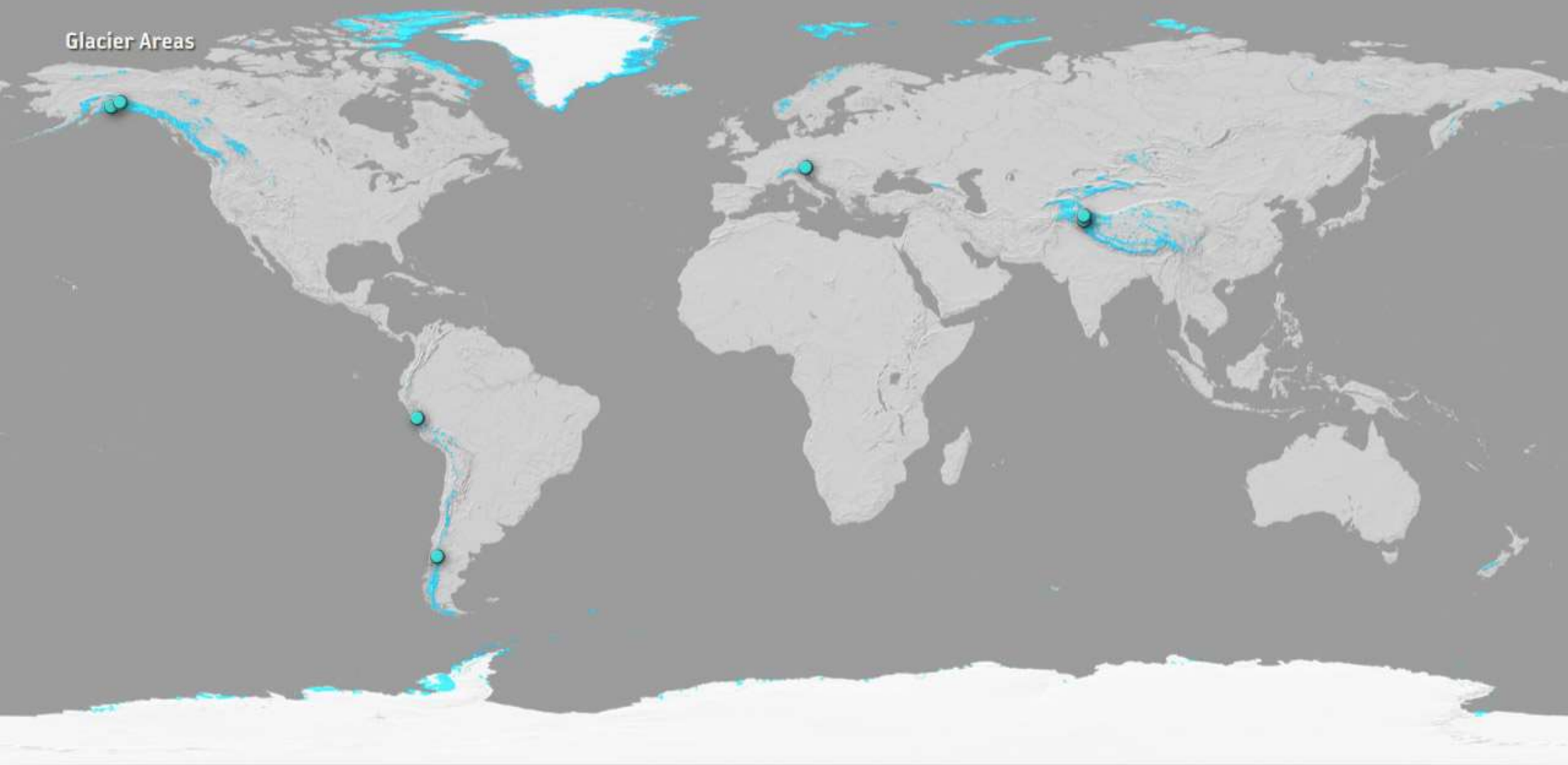
Oct

Nov

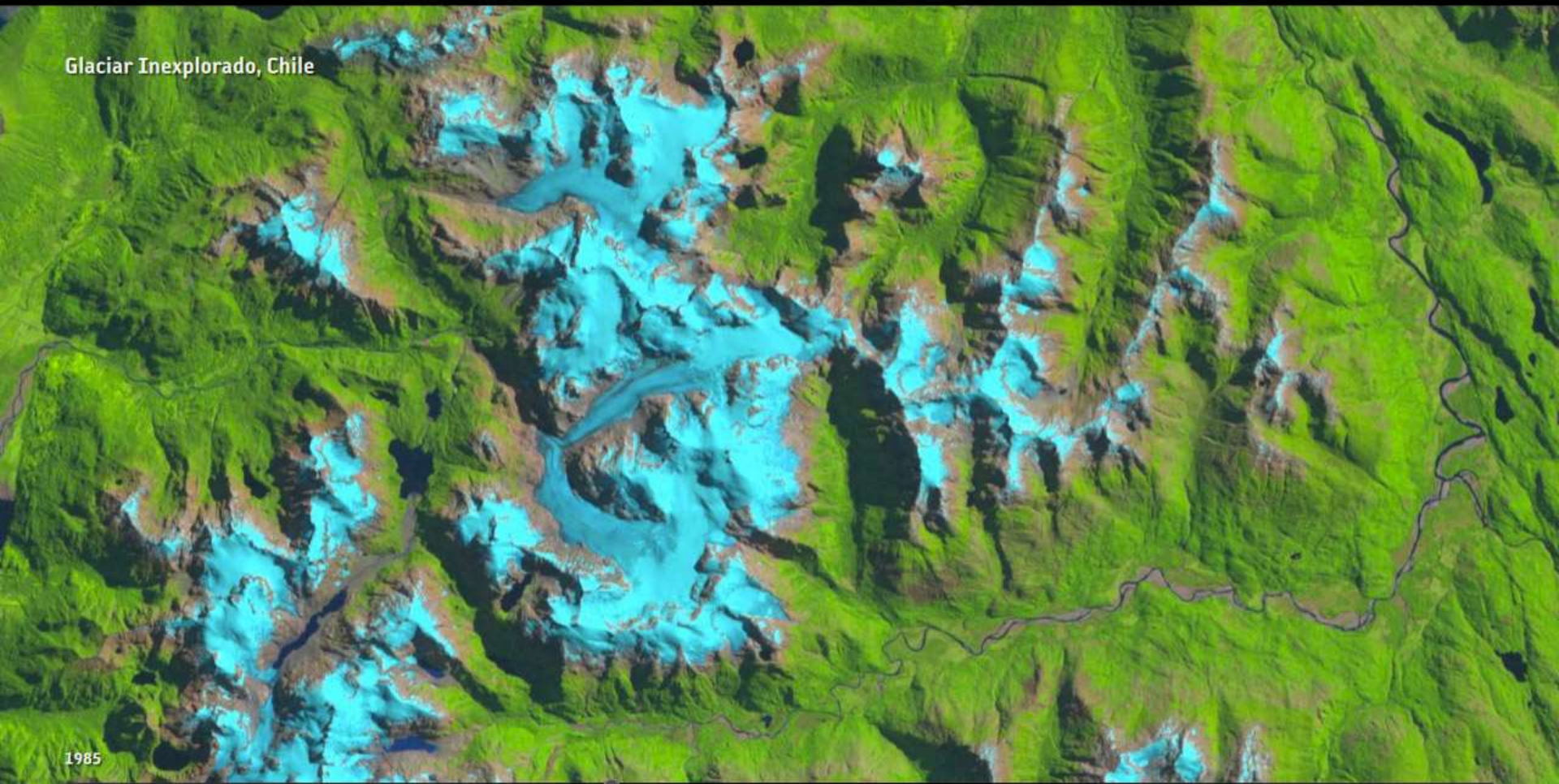
Dec



Glacier Areas



Glaciar Inexplorado, Chile



1985

1985

2000

2011



CCI CONTRIBUTION

The CCI Sea Level project developed a new methodology to reprocess nine different satellite altimetry missions. The project produced new data sets for a Sea Level ECV that are specifically designed for climate applications. Time series of gridded Sea Level Anomalies have been calculated after merging all the altimetry mission measurements together into monthly grids with a spatial resolution of a quarter degree. The data sets have been improved on several scales:

- The Global Mean Sea Level derived from ESA missions (ERS-1, ERS-2, Envisat) has been improved; errors have been reduced and the inter-annual signal is now more consistent with other data sets.
- Regional Mean Sea Level trends have also been significantly improved, providing more detailed patterns of sea level change at a local level.

PROJECT TEAM

Collecte Localisation Satellites (CLS)
 CGI, isardSAT
 Laboratoire d'Études en Geophysique et Oceanographie Spatiales (LEGOS)
 Universität Hamburg, Universität Bonn
 Nansen Environmental and Remote Sensing Centre (NERSC)
 European Centre for Medium-range Weather Forecasts (ECMWF)
 Technical University of Denmark National Space Institute (DTU-Space)
 German Research Centre for Geosciences (GFZ)
 National Oceanography Centre (NOC)
 Faculdade de Ciencias da Universidade do Porto (FCUP)
 Plymouth Marine Laboratory (PML)
 Technische Universität Darmstadt
 Technische Universität München

HEADLINE SOURCES

IPCC, 2013: Summary for Policymakers. In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [T F Stocker, D Qin, G-K Plattner, M Tignor, S K Allen, J Boschung, A Nauels, Y Xia, V Bex and P M Midgley (eds)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

OECD, 2008: R J Nicholls et al, *Ranking Port Cities with High Exposure and Vulnerability to Climate Extremes: Exposure Estimates*, OECD Environment Working Papers, No. 1, OECD Publishing.

SEA SURFACE TEMPERATURE

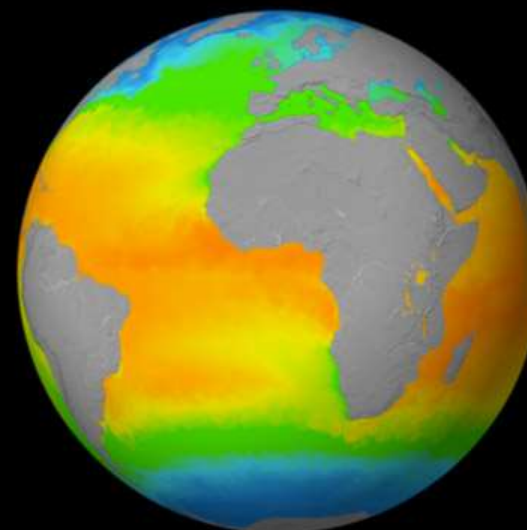
Global trends in SST are subtle (tenths of a degree Celsius per decade), but important. The greatest challenge for SST CCI is therefore to combine accurate SST data from about a dozen satellite missions spread over more than 30 years, such that the resulting climate record faithfully represents subtle changes in SST over time.

The SSTs are made by measuring the temperature-related emission of infra-red light from the ocean surface. But the atmosphere intervenes between surface and satellite, and the scientific challenge is to use sophisticated methods to account for this so that accurate SSTs are obtained.

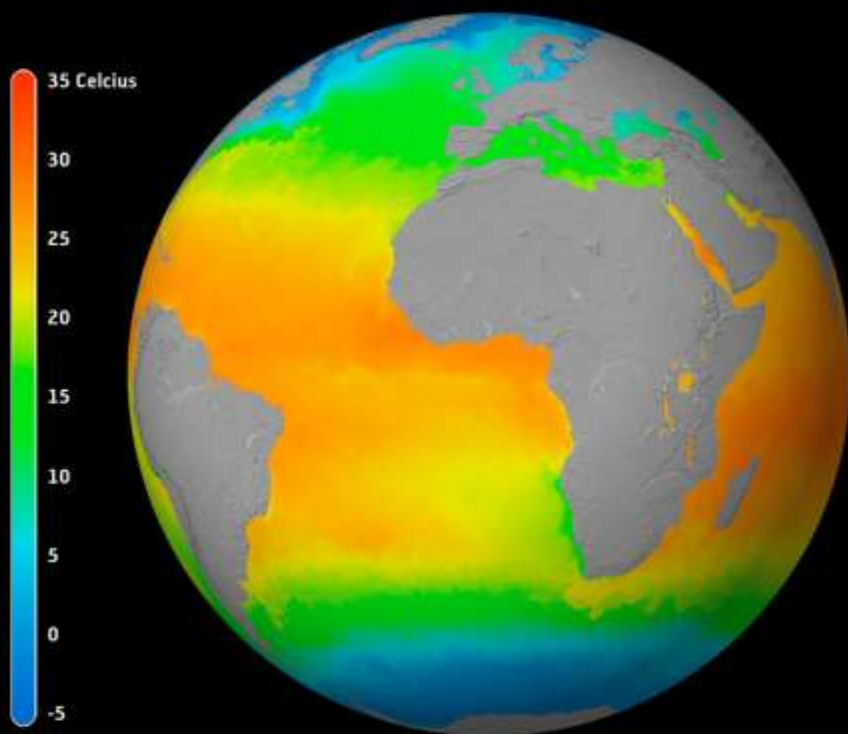
SST sensors collect infra-red images at several wavelengths with spatial resolution of 1 km. From the cloud-free portions of these images, SSTs are derived using methods that have to cope with all the variability of the atmosphere, yet are accurate enough to support climate change research.

DATA SOURCE

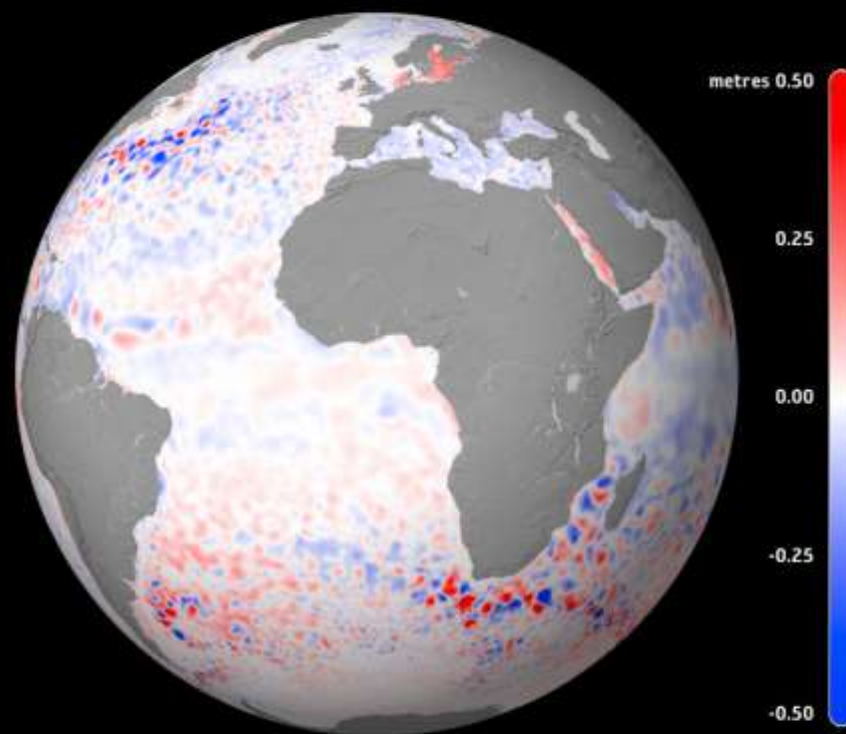
Daily SST CCI L4 analysis 1991-2010 at 0.05 degrees based on merged and interpolated ATSR and AVHRR observations.



Sea Surface Temperature



Sea Level Anomaly



2002-01-01

2002 2003 2004 2005 2006 2007 2008 2009 2010

HOME | BACK



GLOBE | MAP | COMPARE



Sea Surface Temperature

Chlorophyll-a Concentration



°Celsius

2002-10-17



mg/m³

2003

2004

2005

2006

2007

2008

2009

2010

CCI Visualisation Corner

Exhibition Version Comparisons

	Soil Moisture	Glaciers	Sea Level	Carbon Dioxide	Methane	Ozone	Land Cover	Ocean Colour	SST	Cloud	Aerosol	Fire	Ice Sheets	Sea Ice
Soil Moisture			●	●	●		●		●	●	●	●		
Glaciers			●				●							
Sea Level	●	●						●	●					●
Carbon Dioxide	●				●		●					●		
Methane	●			●								●		
Ozone								●			●	●		
Land Cover	●	●		●							●	●		
Ocean Colour			●			●			●		●			
SST	●		●					●		●	●			●
Cloud	●								●		●			
Aerosol	●					●	●	●	●	●		●		
Fire	●			●	●	●	●				●			
Ice Sheets														
Sea Ice			●						●					

CCI Visualisation Corner

Exhibition Version Playlist

<h1>Playlist covering all the projects</h1>

#

5 : index.qml

Sea Surface Temperature

#

15 : [project.qml?project=sst](#)

5 : [show.qml?mode=G&project=sst&data=SST/SST&view=0.0,0.0,1.0&play=1](#)

5 : [show.qml?mode=M&project=sst&data=SST/SST&view=0.0,0.0,1.0&play=1](#)

5 : [show.qml?mode=M&project=sst&data=SST/SST&view=180.0,0.0,1.0&play=1](#)

5 : [show.qml?mode=G&project=sst&data=SST/SST&view=180,0.0,1.0&date=20100218&play=1](#)

5 : [show.qml?mode=G&project=sst&data=SST/SST&view=-120,-20,1.0&play=1](#)

5 : [compare.qml?project=sst&data=SST/SST&auxproject=sealevel&auxdata=SeaLevel/Anomaly&mode=](#)

2 : [compare.qml?project=sst&data=SST/SST&auxproject=sealevel&auxdata=SeaLevel/Anomaly&mode=](#)

5 : [compare.qml?project=sst&data=SST/SST&auxproject=oceancolour&auxdata=OceanColour/Chloroph](#)

5 : [compare.qml?project=sst&data=SST/SST&auxproject=oceancolour&auxdata=OceanColour/Chloroph](#)

5 : [datainfo.qml?project=sst&data=SST/SST](#)

10 : [projectinfo.qml?project=sst](#)

#

5 : index.qml

Ocean Colour

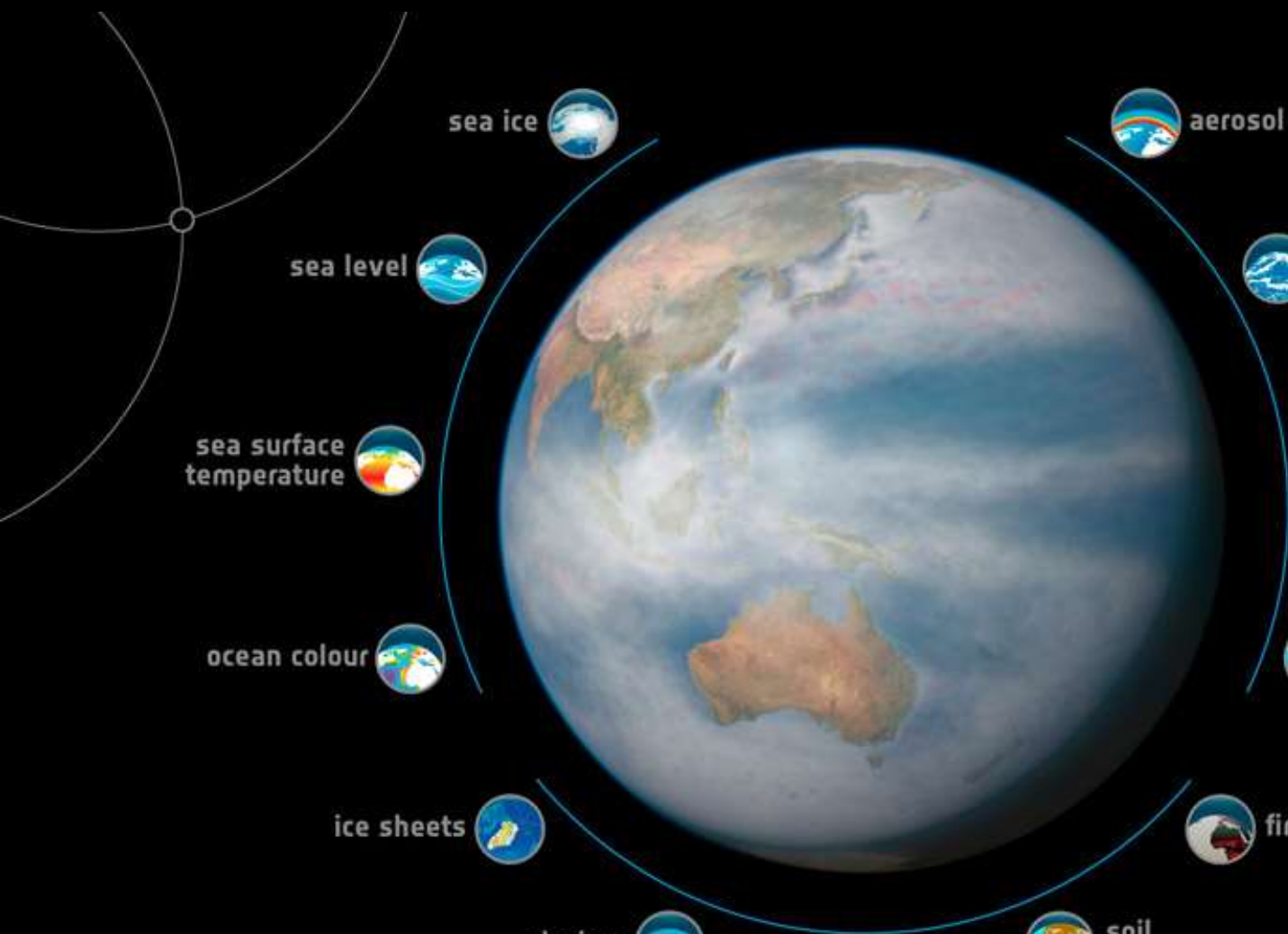
#

15 : [project.qml?project=oceancolour](#)

5 : [projectinfo.qml?project=oceancolour](#)

5 : [show.qml?mode=G&project=oceancolour&data=OceanColour/Chlorophyll&view=0.0,0.0,1.0&play=1](#)

5 : [show.qml?mode=M&project=oceancolour&data=OceanColour/Chlorophyll&view=0.0,0.0,1.0&play=1](#)



CLIMATE CHANGE INITIATIVE

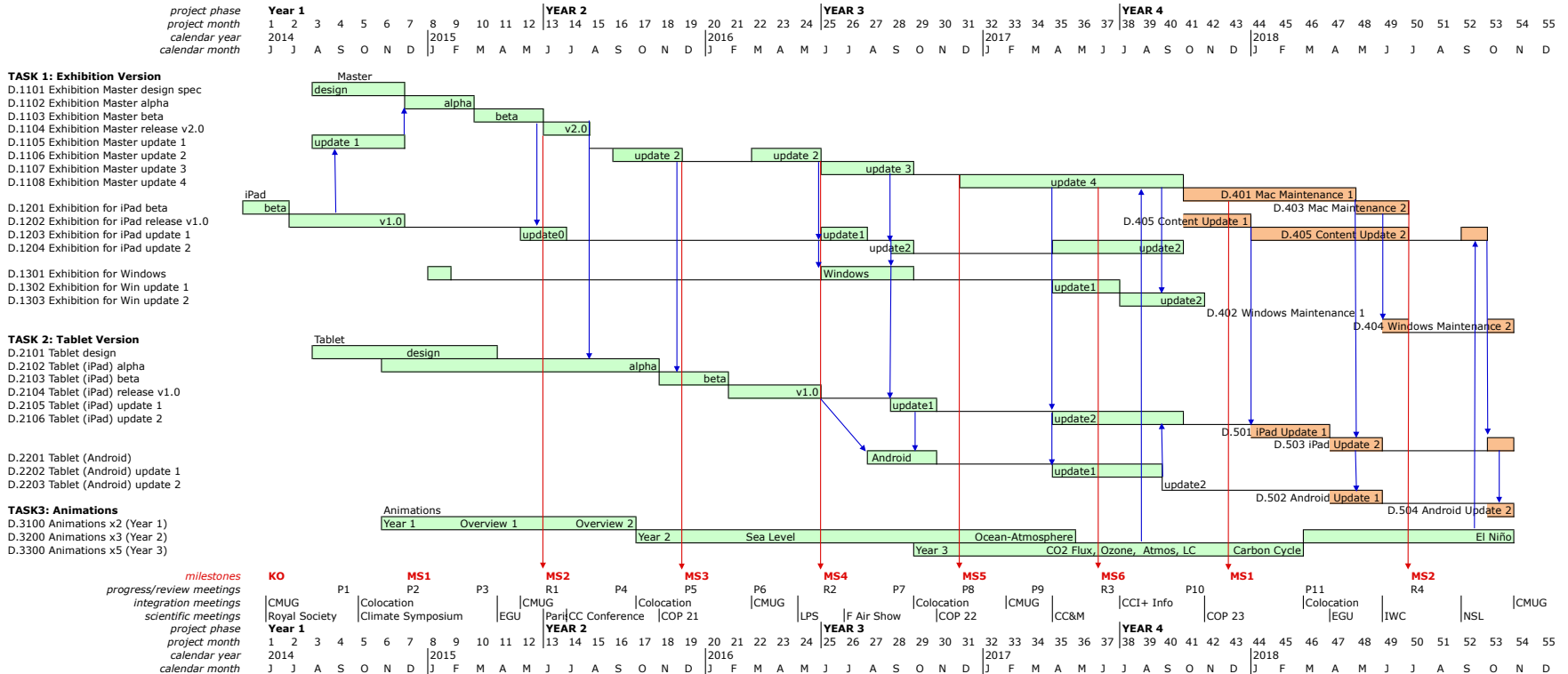


CCI Visualisation Corner

Schedule

ESA CCI Visualisation Corner 2
Outline Schedule
PE/PVL 17.10.18

■ original contract
■ extended contract



Year 1: Exhibition iPad version; Exhibition Master v2; Tablet Version design

Year 2: Tablet Version software engineering

Year 3: Software ports to Android and Windows; Animations

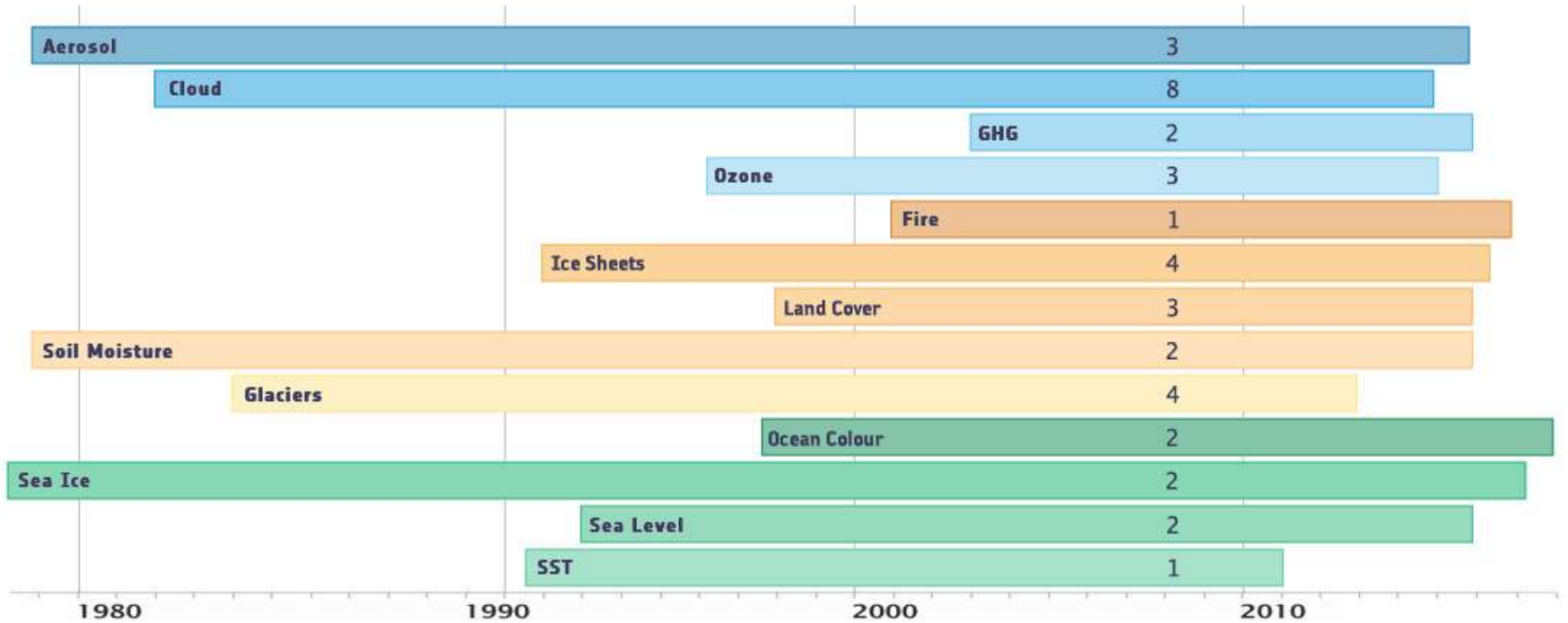
Year 4: Maintenance and Update

CCI Visualisation Corner

Data Updates

ECV	Parameter	2014	2015	2016	2017	2018
Aerosols	Aerosol AOD	•	•	•		
	Aerosol AAI					•
Clouds	Cloud Fraction	•	•	•		•
	other Parameters		•			
GHG	GHG CO2	•	•	•	•	•
	GHG CH4	•	•	•	•	•
Ozone	Ozone T0	•	•	•		
	Ozone Profile				•	
Fire	Fire BA	•	•		•	•
	Fire Annual BA					•
Ice Sheets	Ice Sheets SEC	•	•	•	•	•
	Ice Sheets IV		•		•	
	Ice Sheets GMB					•
Land Cover	Land Cover Map	•				
	Land Cover NDVI	•				
	Land Cover Close-Ups	•		•	•	•
	Land Cover SR			•	•	
	Land Cover HR Africa					•
Soil Moisture	Soil Moisture		•		•	
	Soil Moisture Anomaly	•			•	•
Glaciers	Glacier Areas	•				
	Glacier Close-Ups	•	•			
Ocean Colour	Ocean Colour		•		•	•
Sea Ice	Sea Ice Conc		•	•	•	•
	Sea Ice Thick			•		•
Sea Level	Sea Level Anomaly	•		•		•
	Sea Level Trend			•		•
SST	SST	•	•	•		
	SST Anomaly			•		
CMUG	CMUG CO2 Flux		•			
	CMUG Med SL				•	

CCI Visualisation Corner



CCI Visualisation Corner: over 1TB of CCI products input

<i>version</i>	Exhibition Version		Tablet Version	
<i>platform</i>	Desktop		iPad	
<i>maximum map height</i>	2520 lines		840 lines	840 lines
<i>minimum time step</i>	1 day		8 days	16 days
<i>project</i>	<i>data volume (MB)</i>			
Sea Surface Temperature	5718		574	48
Sea Ice	2183		269	117
Ocean Colour	789		121	120
Greenhouse Gases	37		37	37
Sea Level	117		117	117
CMUG	358		361	48
Aerosols	156		156	15
Soil Moisture	210		210	38
Land Cover	234		235	185
Ozone	132		132	12
Cloud	366		366	47
Fire	87		87	87
Glaciers	37		37	33
Ice Sheets	18		12	14
Science Data	10442 MB		2714 MB	918 MB
Video	903 MB		732 MB	653 MB
Info, Images, Metadata	116 MB		86 MB	105 MB
Software	50 MB		23 MB	84 MB
TOTAL	11,511 MB		3,555 MB	1,760 MB

CCI Visualisation Corner

Software and Data Updates

Exhibition Version *CCI Visualisation Tool*

- open file system
- separate software and content
- easily and incrementally updated
- iPad version content through iTunes

Tablet Version *Climate from Space*

- closed file system
- software and content built into app
- update requires new app build (including app store testing)



CLIMATE



CCI Visualisation Corner: Public Exhibitions

- CCI Press Day, Royal Society, London 13 Jun 2014
- Farnborough International Air Show 14-20 Jul 2014
- The Climate Symposium, Darmstadt 13-17 Oct 2014
- American Geophysical Union, San Francisco 15-19 Dec 2014
- European Geosciences Union, Vienna 12-17 Apr 2015
- International Symposium on Remote Sensing of the Environment, Berlin 11-15 May 2015
- World Meteorological Organisation Congress, Geneva 25 May - 11 Jun 2015
- Paris Air & Space Show 15-21 Jun 2015
- UNFC Climate Change meeting COP21, Paris 30 Nov - 11 Dec 2015



Grand Palais, Avenue des Champs-Élysées



Solutions COP21
Grand Palais
Paris
4-10 Dec 2015



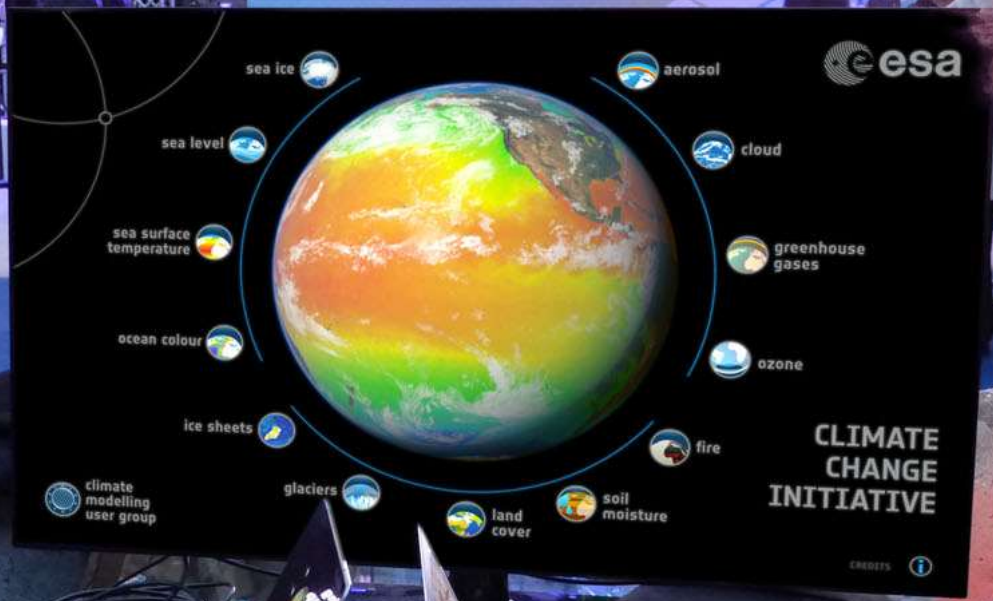
L'ÉLÉMENTAIRE
CLERGUE
Les premiers albums
GRAND PALAIS
14 novembre 2015 - 13 février 2016
grandpalais.fr

SOLUTIONS
COP21
Le grand événement
pour l'écologie et le climat
du 4 au 10 décembre 2015
Grand Palais
Paris

LOUIS VUITTON
BAGAGES
VOLEZ
YOGHURT
VOYAGEZ

ENTRÉE RÉSERVÉE
RESERVED ENTRANCE
ENTRÉE PRINCIPALE
MAIN ENTRANCE
SOLUTIONS
COP21
L'ÉLÉMENTAIRE
CLERGUE
Le grand événement
pour l'écologie et le climat
du 4 au 10 décembre 2015
Grand Palais
Paris

ENTRÉE PRINCIPALE
MAIN ENTRANCE
SOLUTIONS
COP21
L'ÉLÉMENTAIRE
CLERGUE
Le grand événement
pour l'écologie et le climat
du 4 au 10 décembre 2015
Grand Palais
Paris



esa
European Space Agency
Agence spatiale européenne





European Space Agency

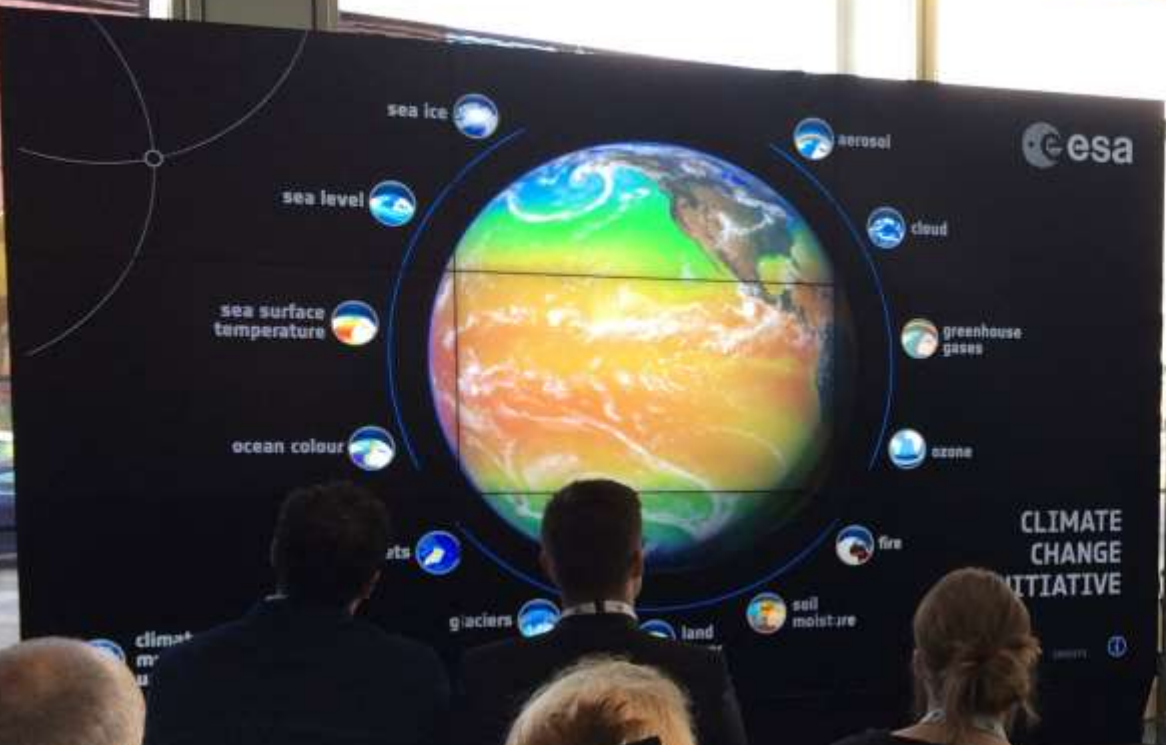
In collaboration with

AIRBUS



RAL Space





Information display area with a laptop and a screen.

NASA

NASA
www.nasa.gov

NASA
www.nasa.gov

NASA
www.nasa.gov



sea ice

aerosol

sea level

cloud

sea surface temperature

greenhouse gases

ocean colour

ozone

ice sheets

fire

glaciers

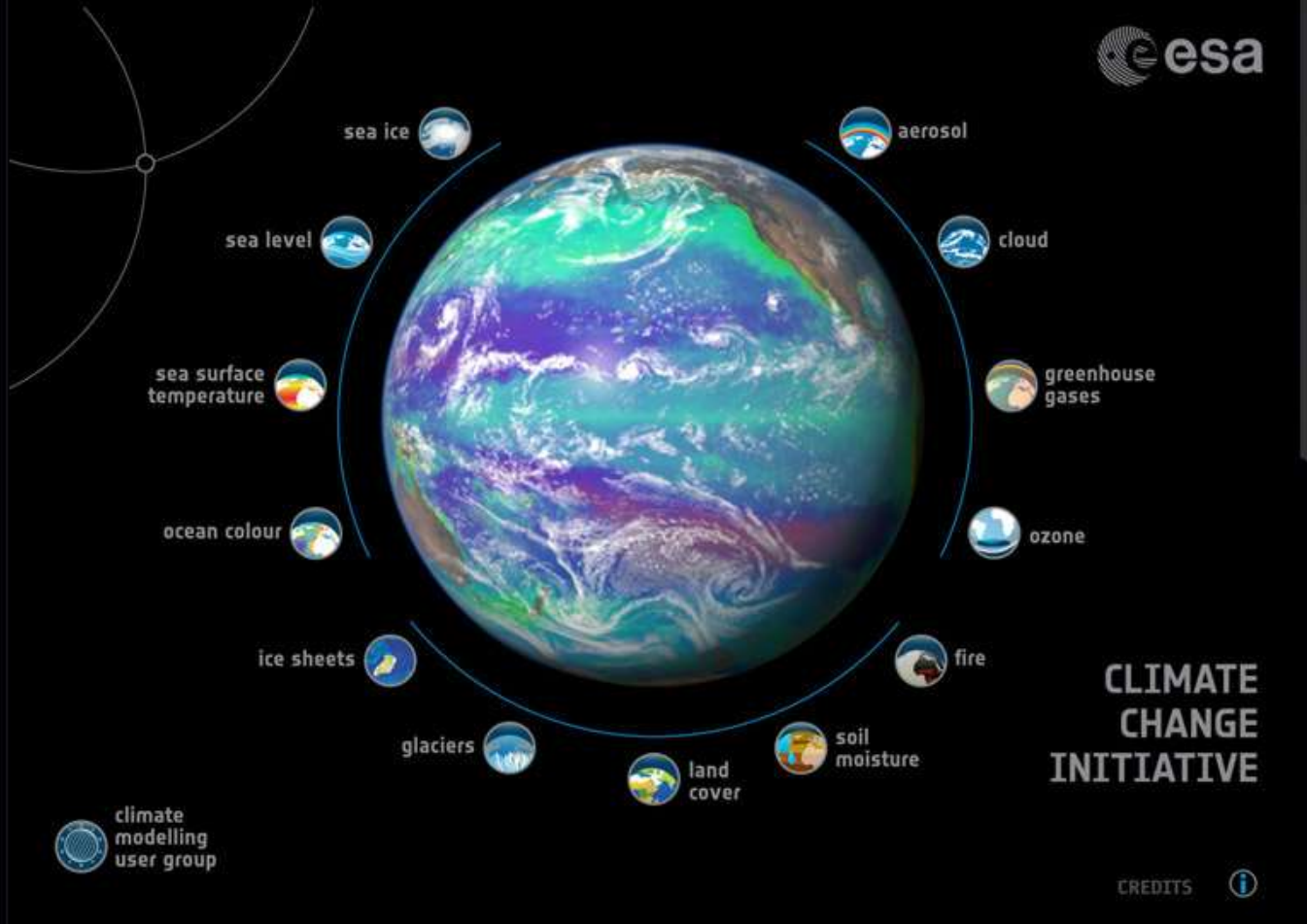
soil moisture

land cover

climate modelling user group

CLIMATE CHANGE INITIATIVE

CREDITS



CCI Visualisation Corner

TASK 2 Tablet Version



→ TOUCH ON CLIMATE

Discover our planet's changing climate through the eyes of satellites with Climate from Space, a new iPad App featuring interactive maps and video interviews with top scientists

CCI Visualisation Corner

TASK 2 Tablet Version

WP2100 Tablet Version on iPad

- wider audience – interested public as well as non-expert scientists
- opportunity (and expectation?) of richer content and high visual quality
- long-form reading, more personal, more of an e-book than a ppt presentation
- data volume limit due to download time and device capacity (16-64GB)
- deployable widely as a published app through iTunes Store

WP2200 Tablet Version on Android

- based on iPad version
- greater hardware diversity, so target a particular hardware spec



CCI Visualisation Corner
TASK 2 Tablet Version



→ climate change initiative



ozone



greenhouse gases



cloud



sea ice



glaciers



sea surface temperature



land cover



aerosols

DEMO



ocean colour



soil moisture



sea level



fire



climate modelling



ice sheets

→ CLIMATE FROM SPACE



data viewer



→ climate change initiative



→ CLIMATE FROM SPACE



glaciers



**land
cover**



**soil
moisture**



fire



**ice
sheets**



climate change initiative



glaciers



land cover



soil moisture



fire



ice sheets



sea ice



sea surface temperature



ocean colour



sea level



ozone



greenhouse gases



cloud



aerosols



climate modelling

the Alps, and the glaciers draping the peaks and high valleys may seem as permanent as the themselves. But sit quietly for a while beside one tons of ice and you may hear the creaks, groans that reveal their true nature; glaciers are flows of compressed snow.

where winter snow accumulates and survives summer melting as a form of granular ice called firn. The weight of new snow the firn is compressed to ice that moves downhill under the force of gravity as it melts in the warmer air at lower altitude. This slow movement over thousands of years has created a unique landscape, creating a unique environment that refreshes and sustains residents and visitors alike.

In many regions all over the world, glacier meltwater is a natural resource that nearby communities have relied on for centuries. In the densely-populated Alps, glaciers are a natural water tower, providing a source of water for industrial and agricultural use, as well as for hydro-electricity. The glacial landscape itself is a major supporting a thriving tourist industry every year.



Aletsche Glacier, Switzerland

Planetary Heat Store

Go for a swim in the sea on midsummers day and the water may be surprisingly chilly. Although the sun is at its highest point in the sky and there are more hours of sunlight than on any other day of the year, the sea does not reach its maximum temperature until three months later, in the autumn. This lag shows that the sea has a high heat capacity – it takes a lot of energy to change its temperature, so it is slow to heat up and slow to cool down.

This makes the sea incredibly good at storing heat. So good, in fact, that just the top three metres of the ocean's water contain as much heat as the entire atmosphere. The ocean's capacity to accumulate, transport and slowly release the energy it receives from the Sun is one of the central mechanisms that regulate weather and climate on our planet.

The Equator receives much more energy from the Sun than the polar regions. This energy is then redistributed around the world by circulation patterns in the oceans and atmosphere. Ocean currents are driven by the rotation of the Earth, surface winds and differences in water density due to salinity and temperature variation. Warm currents such as the Gulf Stream bring heat from the Equator and the tropics to higher latitudes. This poleward transport of heat is

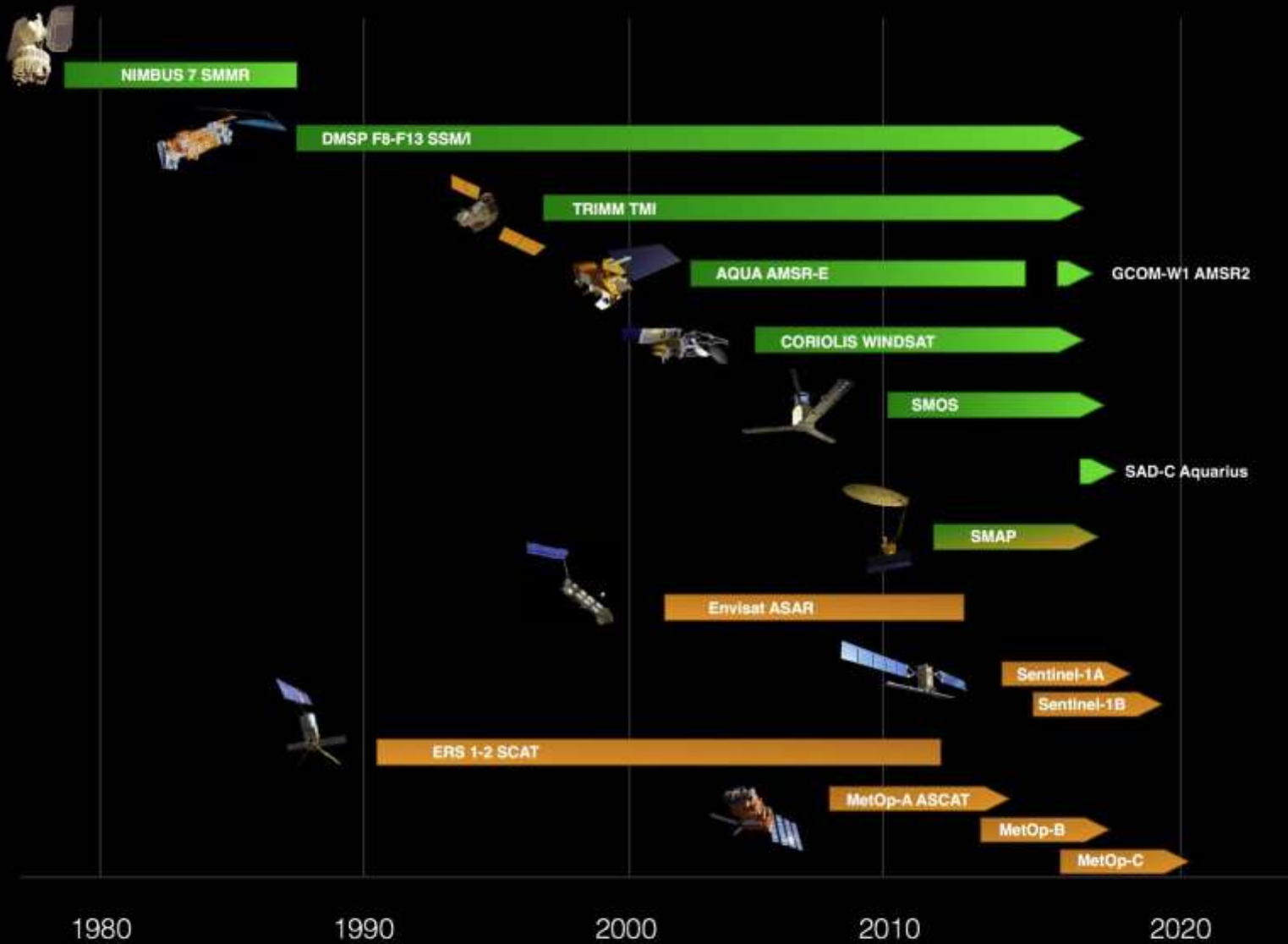


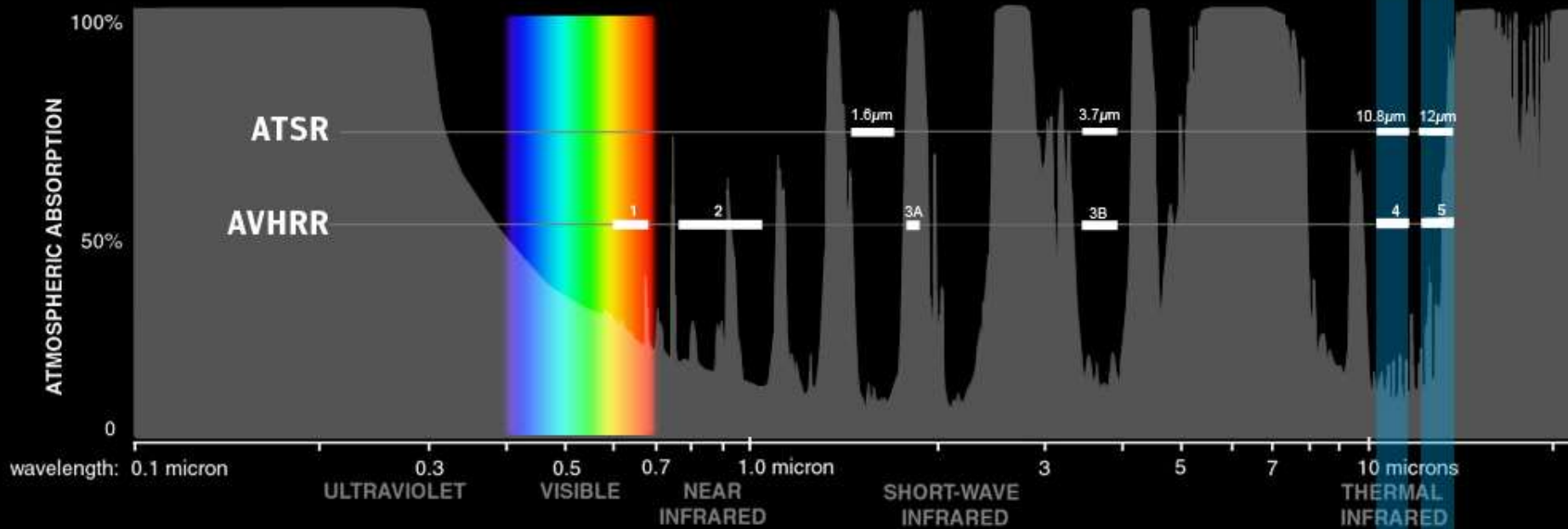
The top three metres of the sea contain as much heat as the entire atmosphere.













Project Team


German Aerospace Center (DLR)
 Finnish Meteorological Institute (FMI)
 Oxford University, Rutherford Appleton Laboratory (RAL)
 Swansea University, Universität Bremen
 Centre National de la Recherche Scientifique
 Lille Université Laboratoire d'Optique Atmosphérique and ICARE data centre
 Royal Netherlands Meteorological Institute (KNMI)
 Belgian Institute for Space Aeronomie (BIRA)
 HYGEOS, Freie Universität Berlin (FUB)
 Norwegian Meteorological Institute (MetNo)
 Max-Planck Institute for Meteorology (MPI-M)
 Max-Planck Institute for Chemistry (MPI-C)
 Norwegian Institute for Air Research (NILU)
 Paul-Scherrer-Institut (PSI)
 Laboratoire de Meteorologie Dynamique (LMD)
 Rayference







 climate change initiative annual variability. An additional by-product is a


 glaciers global map of inland water bodies based on a combination of


 land cover data from different missions including Envisat ASAR
 land cover data from the recently-launched Sentinel-2 and 3

 soil moisture Landsat 8, and the vegetation monitoring mission

 fire Proba-V allows the CCI Land Cover team to produce more
 fire land cover mapping. Sentinel-2's increased temporal

 ice sheets resolution, coupled with high spatial resolution is enabling
 ice sheets us to build a 10-20 m resolution land cover map over

 sea ice data as part of the next stage of the programme.

 sea surface temperature

 ocean colour

 sea level

 ozone

 greenhouse gases

 cloud

 aerosols

 climate modelling

Dr Sophie Bontemps
Scientist, CCI Land Cover



CCI Visualisation Corner
TASK 2 Tablet Version



Climate from Space

ESA - European Space Agency

Features:

- Interactive, animated globes with 17 key climate data sets
- Scroll through time to see thirty years of change
- 130 illustrations, including satellite images, diagrams and animations
- 14 interviews with project scientists
- Over 16,000 words of text
- 74 pages

Available for free download from the Apple and Amazon app stores:

<https://itunes.apple.com/us/app/climate-from-space/id1061553589?mt=8>

<https://www.amazon.com/European-Space-Agency-Climate-from/dp/B01NBKKHYK>

Showing results for "climate"

iPad Apps



Earth-Now
Education
+ Download



Ecosia
Productivity
+ Get



EarthViewer
Education
+ Get



Geostorm
Games
+ Get
In-App Purchases



BBC Focus Magazine
News
+ Get
In-App Purchases



Weather Watchman - ...
Weather
+ Get
In-App Purchases



Global Warming - How to Talk t...
Weather
+ Get
In-App Purchases



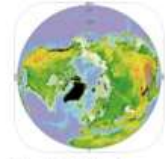
WIREs Climate Change
Education
+ Get
In-App Purchases



Climate from Space
Books
Download



Climate Pathways
Education
+ Get



Global Climate News
News
+ Get



Climate - Weather...
Weather
+ Get
In-App Purchases



Holiday Climate
Weather
£0.79



M Melissa Climate
Utilities
+ Get



Climate Cloud City - Lastest...
Weather
+ Get



Marina Climate
Weather
+ Get
In-App Purchases



Climate FieldView™
Business
+ Get



Weather Plus bundle: local...
4 Apps
£5.99

- All
- iPhone Apps
- iPad Apps**
- Apps for Apple Watch
- iMessage Apps
- Films
- Podcasts
- Albums
- Songs
- Books
- Audiobooks
- iTunes U
- TV Programmes
- Music Videos

ARTISTS AND MORE

- Climate >
- Electronic
- climate >
- Electronic
- Climate >
- Electronic
- Emerson Climate Technologies, Inc. >
- App Developer
- United Nations Framework Convention on Climate Change, UNFCCC >
- App Developer

App Store Preview

This app is only available on the App Store for iOS devices.

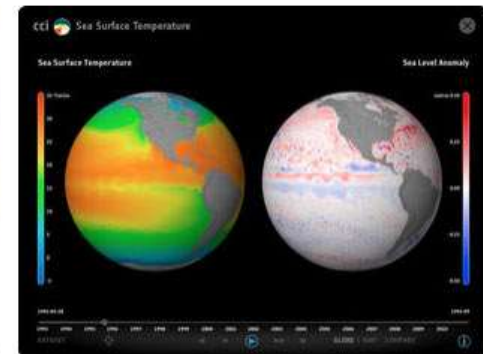


Climate from Space 4+

ESA - European Space Agency

Free

iPad Screenshots



Description

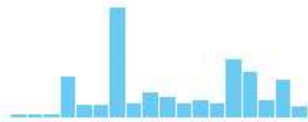
Satellites observing the Earth from space provide a clear picture of the health of our planet and the signs of climate change. This electronic book lets you take a closer look at the climate data being produced by the European Space Agency's Climate Change Initiative.

Thirty years of climate data are at your fingertips on interactive globes and maps. Use the data viewer to see how climate variables including ocean

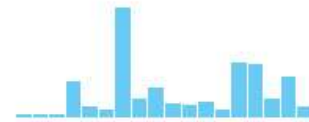
Feb 1, 2016-Jul 17, 2017



11,615 Impressions



1,696 Product Page Views



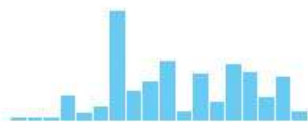
984 App Units



0 In-App Purchases



\$0 Sales



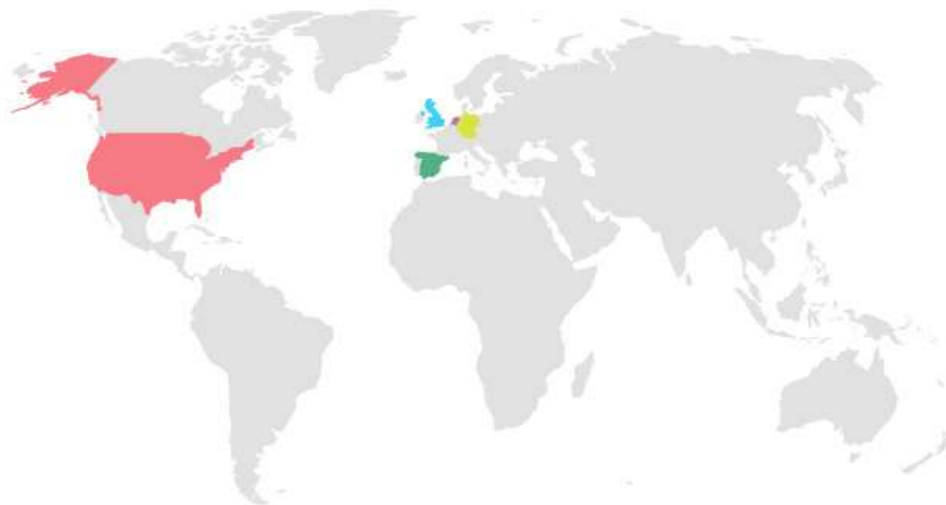
641 Sessions Opt-in Only



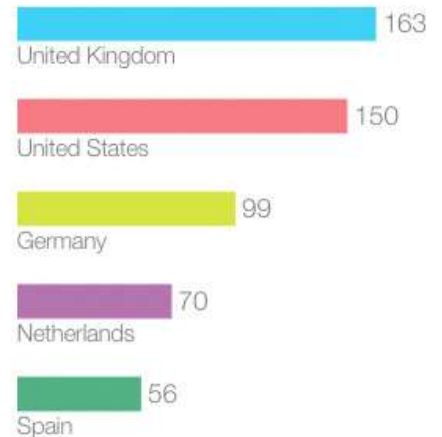
17 (Monthly Average) Active Devices Opt-in Only



0 Crashes Opt-in Only

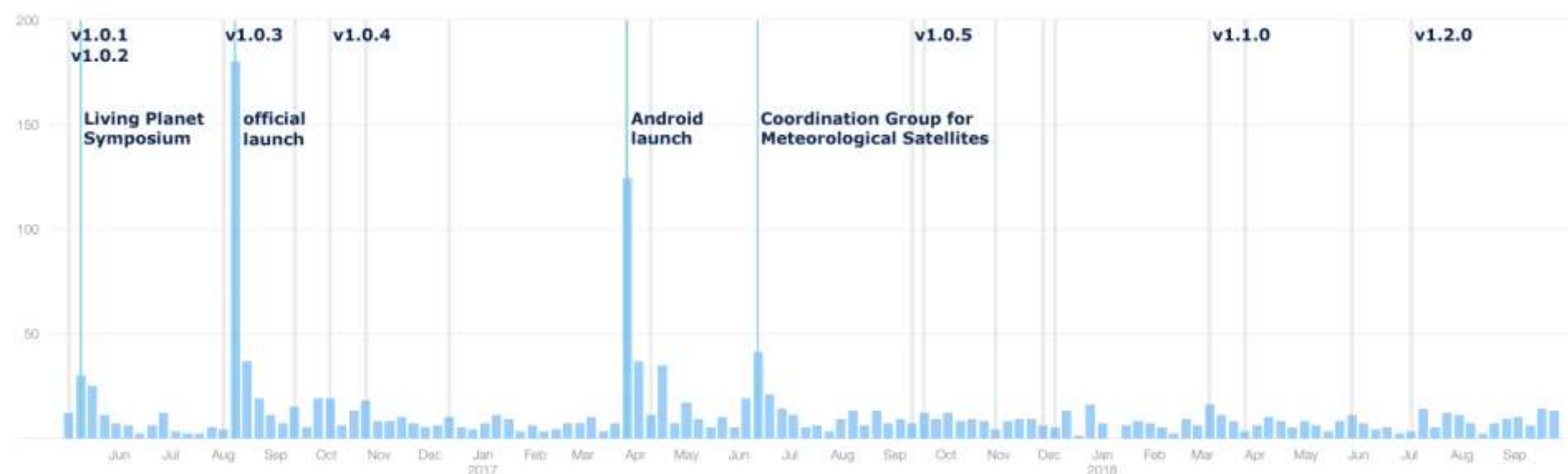


App Units by Territory



CCI Visualisation Corner

TASK 2 Tablet Version



- iPad downloads since launch: 5,897
- impressions conversion: 5.7%
- product page views conversion: 57%; 68% unique devices; 70% weekly averaged (cf education category average page conversion: 6.75%)
- sessions/unit: 0.95 (weekly)
- crashes: 0
- downloads to 20 of ESA's 22 member states (and to Canada)
- currently about 10 downloads a week

CCI Visualisation Corner

TASK 2 Tablet Version



Climate from Space on iPad Pro and Samsung Galaxy Tab S2

TASK 3 Animations



WP3000 Animations

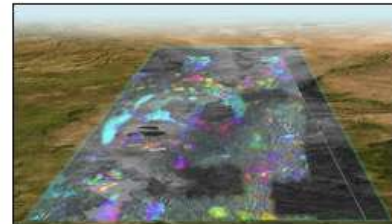
- wider reach through web and television
- custom 3D graphics, linear not interactive
- opportunity to show related and complementary ECVs together
- tell stories about the data
- explain what the data reveals
- relate the data to the viewer's daily life
- 10 x animations, up to 2 min duration

CCI Visualisation Corner

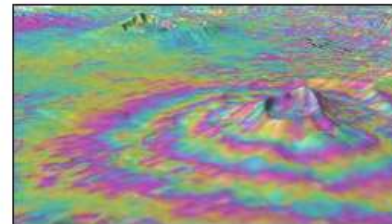
TASK 3 Animations

Production procedure established for ESA STSE Visuals project:

- Briefing - with science team
- Preliminary Analysis - editorial and data requirements
- Storyboard - visual treatment
- Data look and feel - colours, supporting data
- Animation rushes - key frames, motion
- Titles, captions, transitions - style, timing
- Final version - encoded at HD, SD, web size

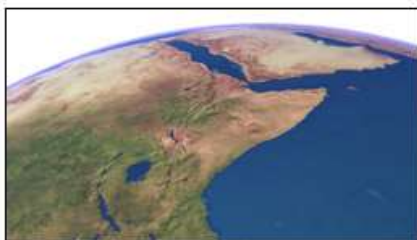


6. Fade up interferogram in area of image overlap.



7. Move in to view detailed topography and interference fringes at Longonot site. Perhaps use displacement map to show measured uplift of surface.

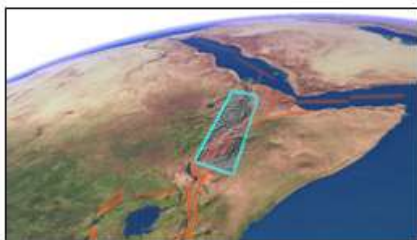
ESA STSE Visuals Storyboard: Rift Valley Dynamics (version 5)
PVL/PE 6.9.12



1. Open on an overview of the East African Rift Valley from orbit, using natural colour satellite imagery.



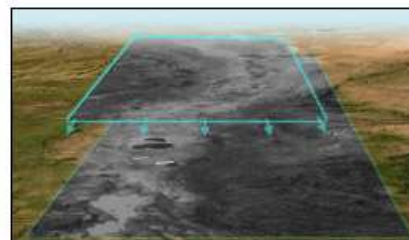
2. Overlay major fault lines to show location of Rift Valley. Perhaps also show earthquake locations?



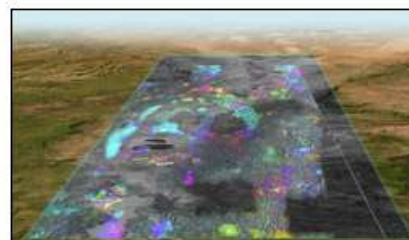
3. Descend towards Rift Valley as ASAR image swaths are overlaid on the surface. (SRTM30 terrain model, MODIS 500m imagery)



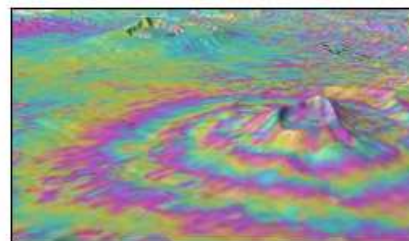
4. Descend to Northern Kenya as additional ASAR images are overlaid.



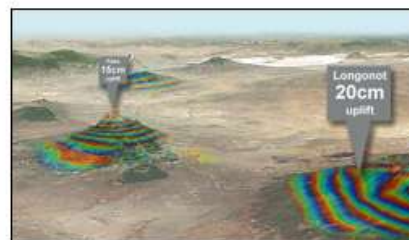
5. Approach ASAR image covering Longonot National Park area. Overlay ASAR image from second date. (SRTM3 terrain, ASAR imagery, perhaps Landsat imagery)



6. Fade up interferogram in area of image overlap.



7. Move in to view detailed topography and interference fringes at Longonot site. Perhaps use displacement map to show measured uplift of surface.



8. Fly north past other sites with measured surface displacement. Labels show measured uplift or subsidence at selected sites:

- Longonot
- Suswa
- Menengai
- Raka
- Corbati
- Alutu

CCI Visualisation Corner

TASK 3 Animations

30 minutes of 3D computer graphics, broadcast-quality HD1080, covering all projects

- 1) **CCI Overview** – all projects
- 2) **Sea Level Rise Contributions** – ice sheets, glaciers, sst, sea level, land cover
- 3) **Ocean-Atmosphere Interactions** – sst, ocean colour, cloud, sea ice
- 4) **Carbon Dioxide Ocean flux** – ocean colour, cmug
- 5) **Ozone** – ozone, aerosol
- 6) **Atmospheric ECVs** – fire, aerosol, cloud, ghg, ozone
- 7) **Land Cover Mapping** – land cover
- 8) **Carbon Cycle** – land cover, fire, ghg, cmug
- 9) **El Niño** – sst, ocean colour, cloud, fire, soil moisture

CCI Visualisation Corner

TASK 3 Animations

animation_title	animator	Glaciers	LandCover	SoilMoisture	Fire	IceSheets	SeaIce	SeaSurfaceTemperature	OceanColour	SeaLevel	Ozone	GreenhouseGases	Cloud	Aerosols	ClimateModellingUserGroup	numberofprojects	numberofdatasets	duration
CCI Overview	AW															13	15	3m04s
SeaLevelContributions	AW															5	9	2m28s
Ocean-AtmsphereInteractions	AW															4	6	1m48s
CMUGCO2Flux	DJ															2	3	2m47s
Ozone	DJ															2	3	2m39s
Atmosphere	DJ															5	5	3m13s
LandCover	DJ															1	7	4m36s
CarbonCycle	AW															5	6	3m20s
ElNiño	AW															5	7	3m00s

CCI Visualisation Corner

CCI+ Knowledge Exchange

- Android version on Google Play Store (currently on Amazon)
- *Climate from Space* on desktop (MacOS development version)
- Data Viewer on iPhone

- Include nine new ECVs
- *Climate from Space* on web
- Earth System Story animations
- Education: classroom resources

- Abstract in to LPS2019, Milan



philip@planetaryvisions.com