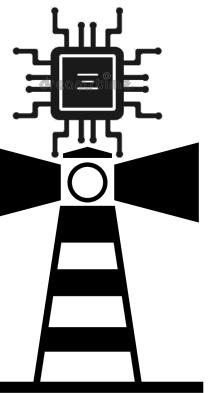


Digital Earths Lighthouse Activity

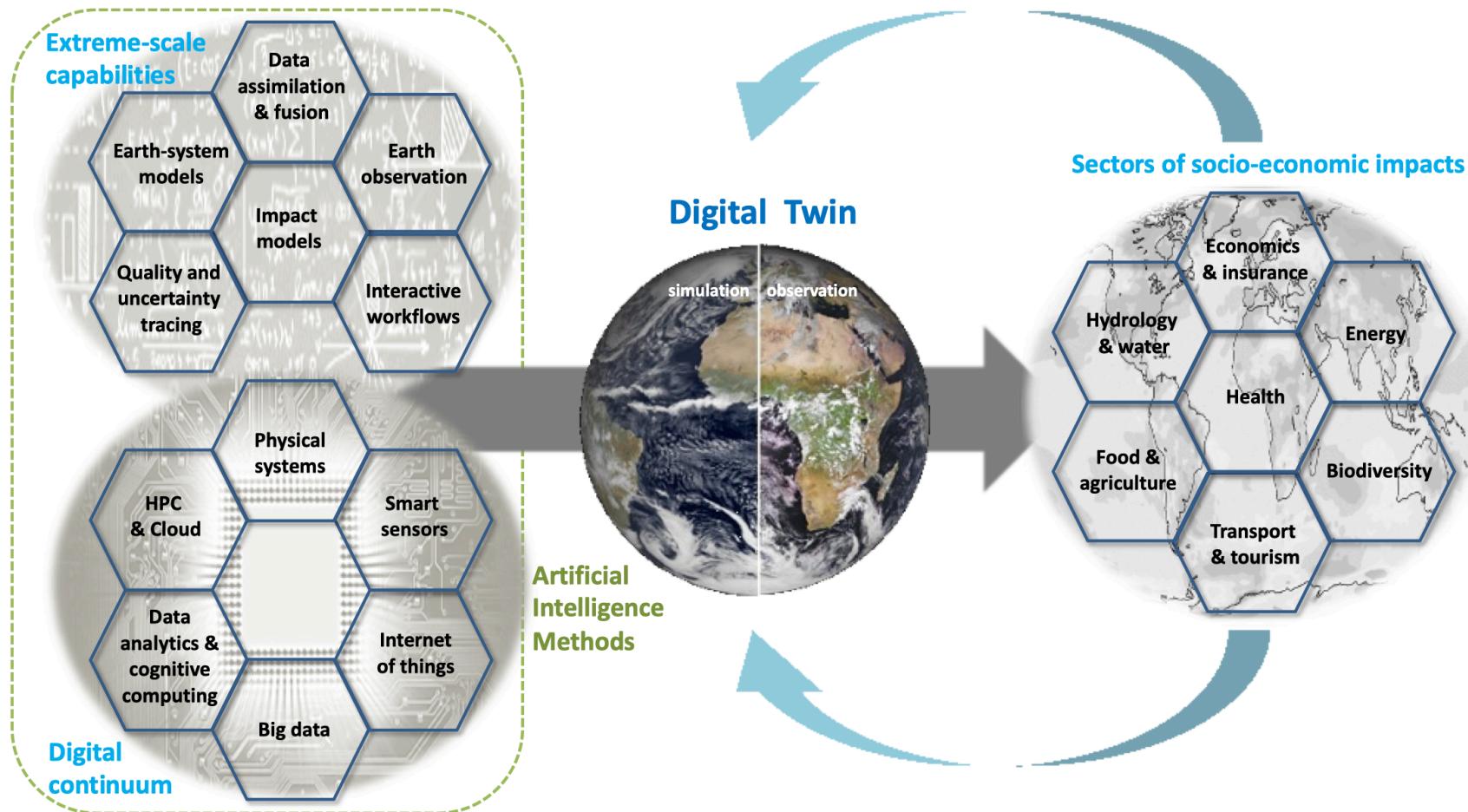


DRAFT WCRP Lighthouse Activities

Christian Jakob & Peter Bauer (co-chairs)
Andreas Prein
Andrew Gettelman
Aneesh Subramanian
Bryan Lawrence
Camille Lique
Chihiro Kodama
Claas Teichmann
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Mark Govett
Martin Visbeck
Michael Morgan
Pascale Braconnot
Peter Dueben
Pier Luigi Vidale
Svetlana Jebvrejeva
& Narelle van der Wel & Wenchoao Cao

What is Digital Earths (and what is it not)?

The idea:



A global interactive information system describing past, present and future states of planet Earth

Why now?

Break-throughs:

1. Extreme-scale computing and data handling:
= *much more realistic models + better combination of simulations + observations*
2. Full integration of policy sectors in monitoring and prediction workflow
= *Earth-system + energy + food + water + finance*
3. Open and interactive access to data, software and workflows for users
= *non-expert access and intervention*

The screenshot shows a news article from the Science section of a website. At the top, there are navigation links for 'Contents', 'News', 'Careers', and 'Journals'. Below these are social media icons for Facebook, Twitter, LinkedIn, and Email. The main image is a split-screen showing a real satellite image of Earth on the left and a computer-generated digital twin on the right, which appears nearly identical. A caption below the image reads: 'At 1-kilometer resolution, a European climate model (left) is nearly indistinguishable from reality (right). (LEFT TO RIGHT) ECMWF; © EUMETSAT'. The article title is 'Europe is building a 'digital twin' of Earth to revolutionize climate forecasts' by Paul Voosen, published on Oct. 1, 2020, at 10:40 AM.

Science

Contents News Careers Journals

f t in 2 e

At 1-kilometer resolution, a European climate model (left) is nearly indistinguishable from reality (right). (LEFT TO RIGHT) ECMWF; © EUMETSAT

Europe is building a 'digital twin' of Earth to revolutionize climate forecasts

By Paul Voosen | Oct. 1, 2020, 10:40 AM

The screenshot shows two news articles. On the left is a 'NewScientist' article titled 'Building digital twins of Earth could help Europe cut carbon emissions' by Adam Vaughan, published on 12 October 2020. It features a large image of a digital globe with a network of connections. On the right is a 'nature COMMUNICATIONS' article titled 'New priorities for climate science and climate economics in the 2020s' by David A. Stainforth and Raphael Calel. This article has an 'OPEN' access link and a DOI: <https://doi.org/10.1038/s41467-020-16624-8>.

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ENVIRONMENT 12 October 2020 By Adam Vaughan

Building digital twins of Earth could help Europe cut carbon emissions

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<https://doi.org/10.1038/s41467-020-16624-8> OPEN

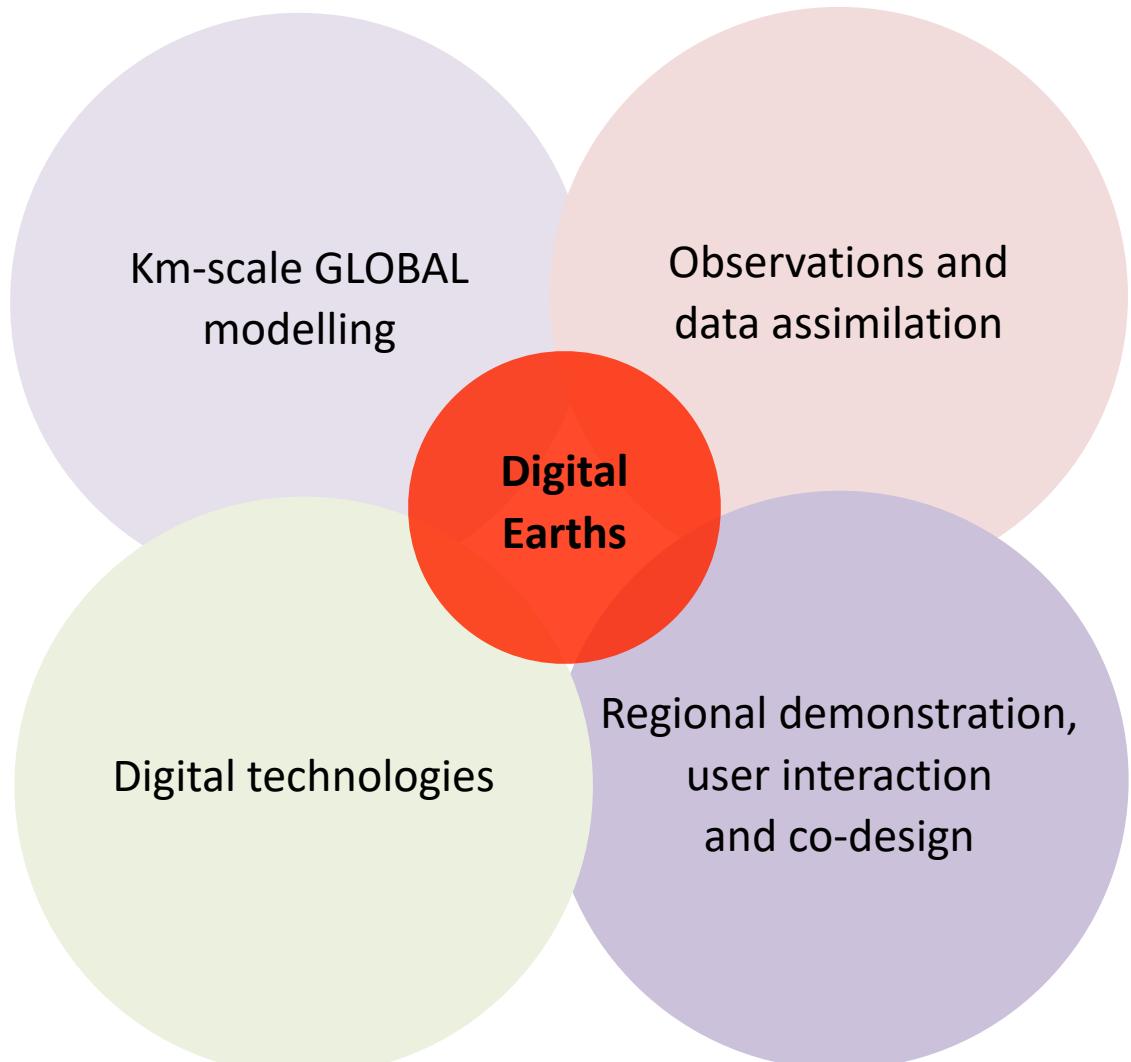
New priorities for climate science and climate economics in the 2020s

David A. Stainforth^{1,2,3} & Raphael Calel^{1,4}

A framework rather than an implementation

- Digital Earths is a **FRAMEWORK** to develop capabilities across the globe.
- This requires to create science activities whose software outcomes are: ***open and freely available, modular and interoperable, and built to agree upon standards.***
- We envisage both ***global and regional*** Digital Earths systems to be developed under this Framework
- Early efforts are envisaged to focus on 4 areas: modelling, data assimilation, digital technology and regional demonstration
(as a complement to supporting other LHA)

First steps:



What does this all mean for Australia?

- Digital Earths systems WILL BE BUILT somewhere around the world (e.g., DestinE project in the EU)
- Digital Earths systems are extremely ambitious , but also potentially extremely attractive to funders.
- Digital Earths systems unite communities as they CANNOT be built within existing structures (e.g. Data assimilation for climate; Digital Technologies)
- A global Digital Earths systems is well out of reach for Australia, but a regional systems not.
- What will our ambition and role in the brave new world of Digital Earths be?

