

Group 4b: Science challenges & feasibility of AI solutions for teleconnections and extremes



Seed questions

- 1) Is there already any **existing/planned** CCI research involving AI covering these topics ?

- 2) Are there any other **potential AI applications** that would be useful for CCI?
 - o which ECV's would be involved?
 - o what other resources may be needed? (e.g. external datasets, models, external AI expertise).
 - o which methods could be used?

- 3) What are the **benefits / pitfalls** in using AI for these activities?



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1) Is there already any **existing/planned** CCI research involving AI covering these topics ?

From survey:

Analysis of multi-decadal records for extreme events (Aerosol CCI, SSS)

Interactions between ECVs, cross-classification, feature detection (Fire, Ocean Colour)

Any other?

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2) Are there any other **potential AI applications** that would be useful for CCI?

Examples from CCI AI survey and workshop:

Teleconnections

North Atlantic and North-Pacific Oscillation their connection to Arctic sea-ice
El Niño and La Niña Underlying Causes, Can we improve the predictability of El Nino?

Teleconnections and extremes

ENSO (El Nino Southern Oscillation) and Indonesian/ Australian fires, soilmoisture
Understanding the connection between changes in global/local precipitation (anomalies) and indices/ teleconnections

Extremes

Relationships between mid-latitude climate extremes and Arctic sea-ice extent
North Atlantic SSS (Sea Surface Salinity) anomalies and rain over Sahel desert

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2) Are there any other **potential AI applications** that would be useful for CCI?

... ENSO and Indonesian/ Australian fires, soilmoisture...

... Niño and La Niña Underlying Causes, Can we improve the predictability of El Nino?...

o **which ECV's** would be involved?

... SST, Fire, SM...

... SST, SSH, SSS, Water vapour, Clouds, Radiation...

o other resources needed? (e.g. external datasets, models, external AI expertise).

... Reanalysis ...

o which **methods** could be used?

... Self organizing maps (SOM), Causal effect networks (CEN)...



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3) What are the potential benefits / pitfalls in using AI for these activities?

Satellite data not homogeneous in time and space

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