

Constructing regional climate information relevant for risk assessments and decision making: Insights from IPCC AR6 WGI



Anna A. Sörensson



Chapter 10: Linking global to regional climate change

Coordinating Lead Authors:

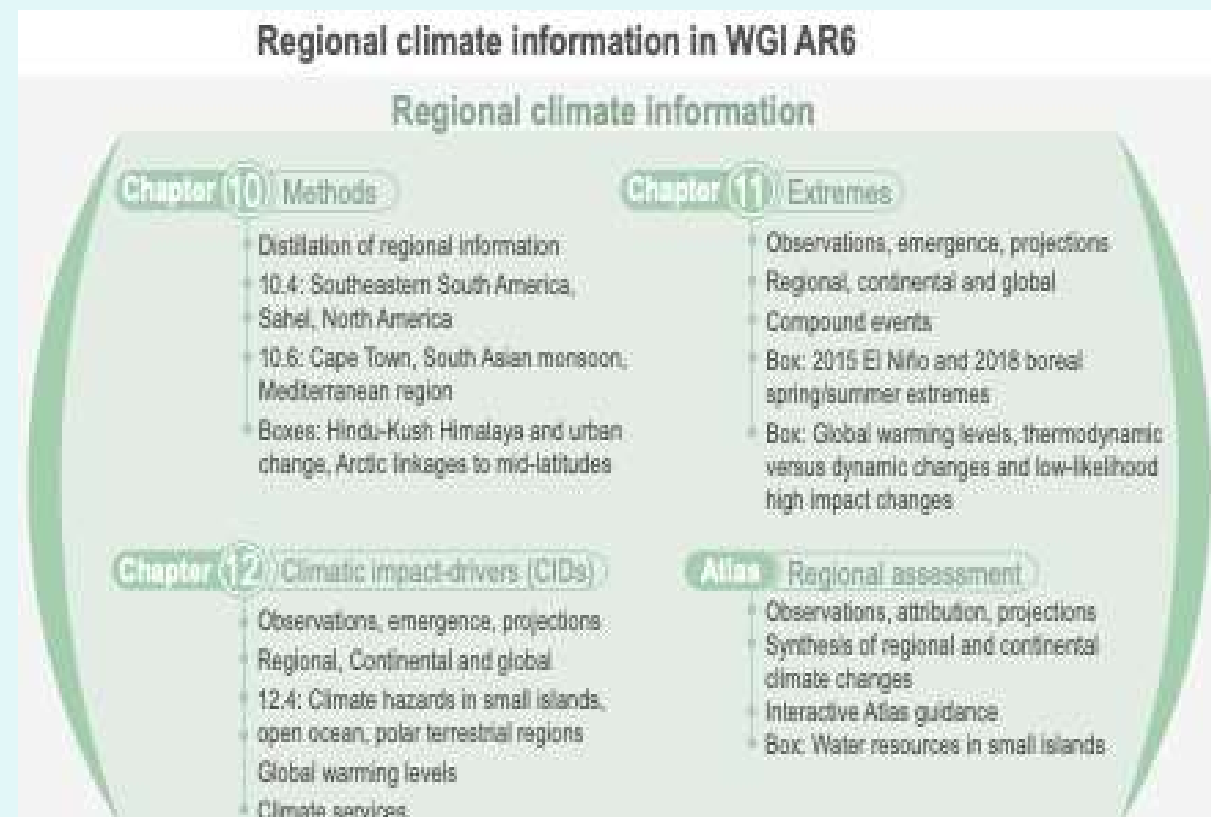
Francisco J. Doblas-Reyes, Anna A. Sörensson

Lead Authors: Mansour Almazroui, Alessandro Dosio, William Gutowski, Rein Haarsma, Rafiq Hamdi, Bruce Hewitson, Won-Tae Kwon, Benjamin Lamptey, Douglas Maraun, Tannecia Stephenson, Izuru Takayabu, Laurent Terray, Andrew Turner, Zhiyan Zuo

Regional Information in AR6 WGI

Climate information on spatial scales ranging from sub-continental to local is needed for impact and risk assessments

- 4 regional chapters (1/3 of the report)
- Global and process chapters including regional information.
- Technical Summary contains a synthesis of all regional information, region by region
- Handshake with WGII (Impacts, Adaptation and Vulnerability)



Regional Information in AR6 WGI

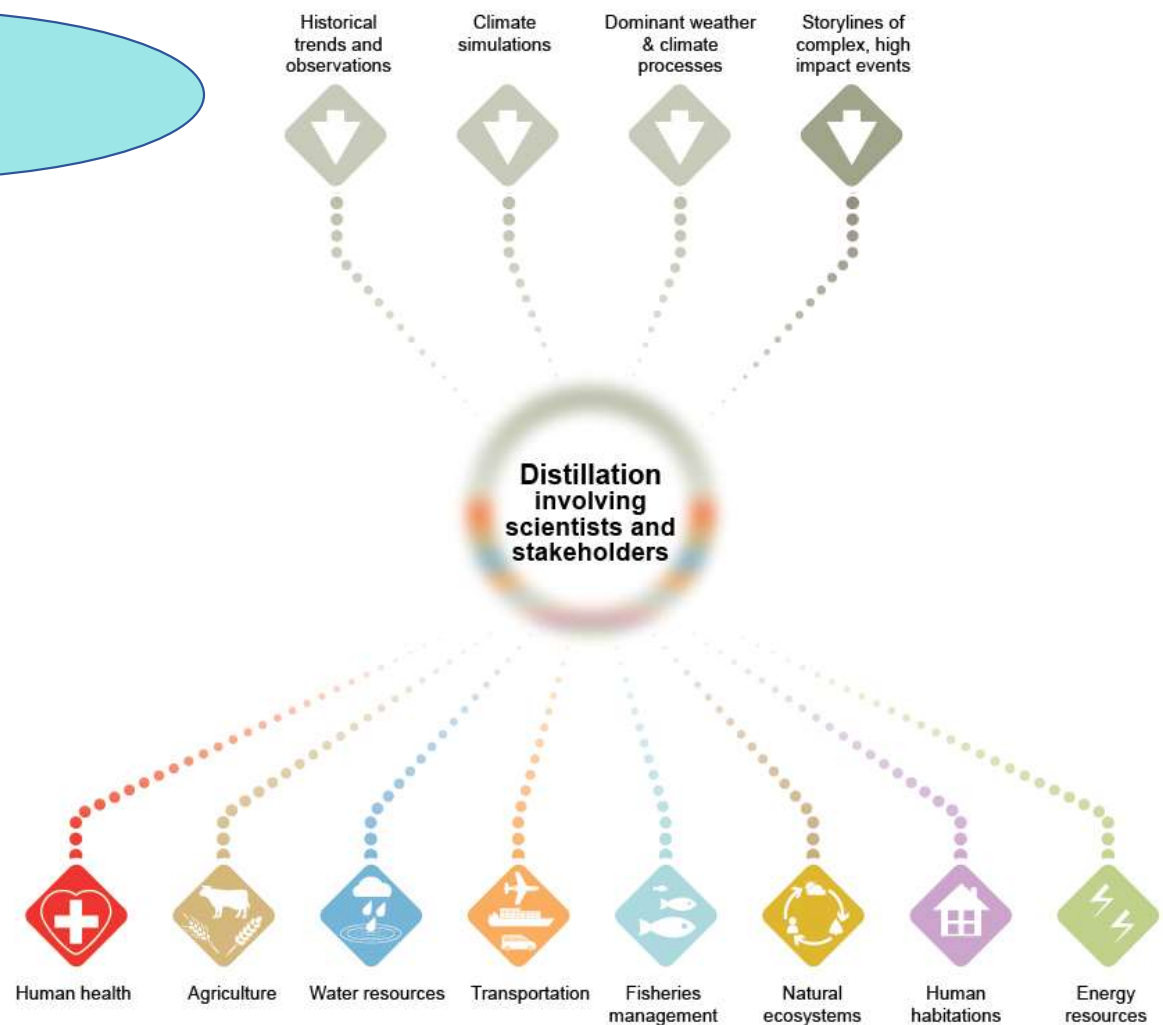
Role of Ch10:

- Chapter 10 assesses the foundations of how to ***distill*** regional climate information that is ***useful for decision making*** from multiple lines of evidence
- Assesses methodologies used in literature and used in Ch:s 11, 12 and Atlas.
- Climate Services, Regional/National assessments, impact studies in mind.

The Distillation Process

Sources of
information

Information that can
be integrated in
decision-making in
society

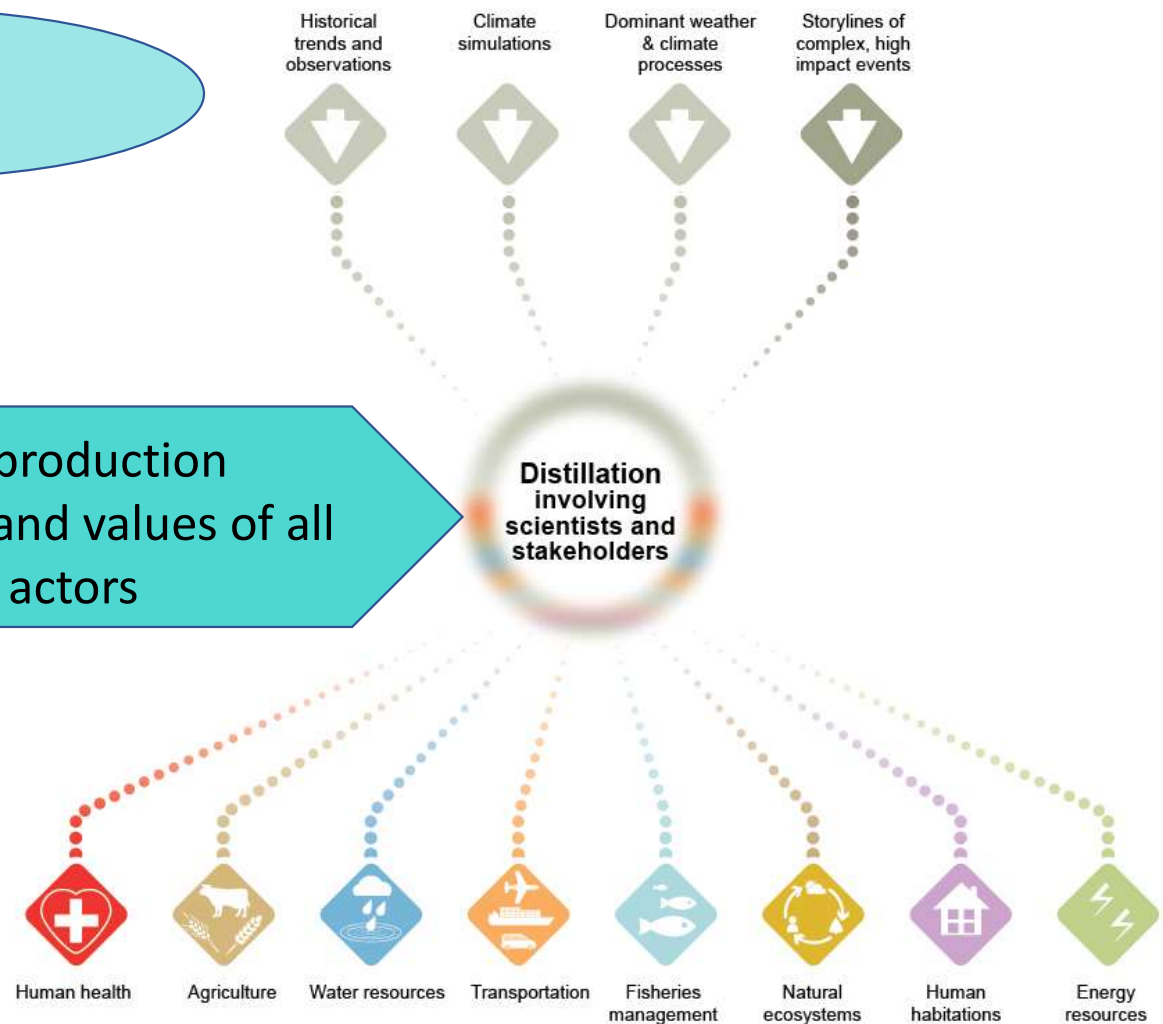


The Distillation Process

Sources of information

Co-production
Context and values of all
actors

Information that can
be integrated in
decision-making in
society



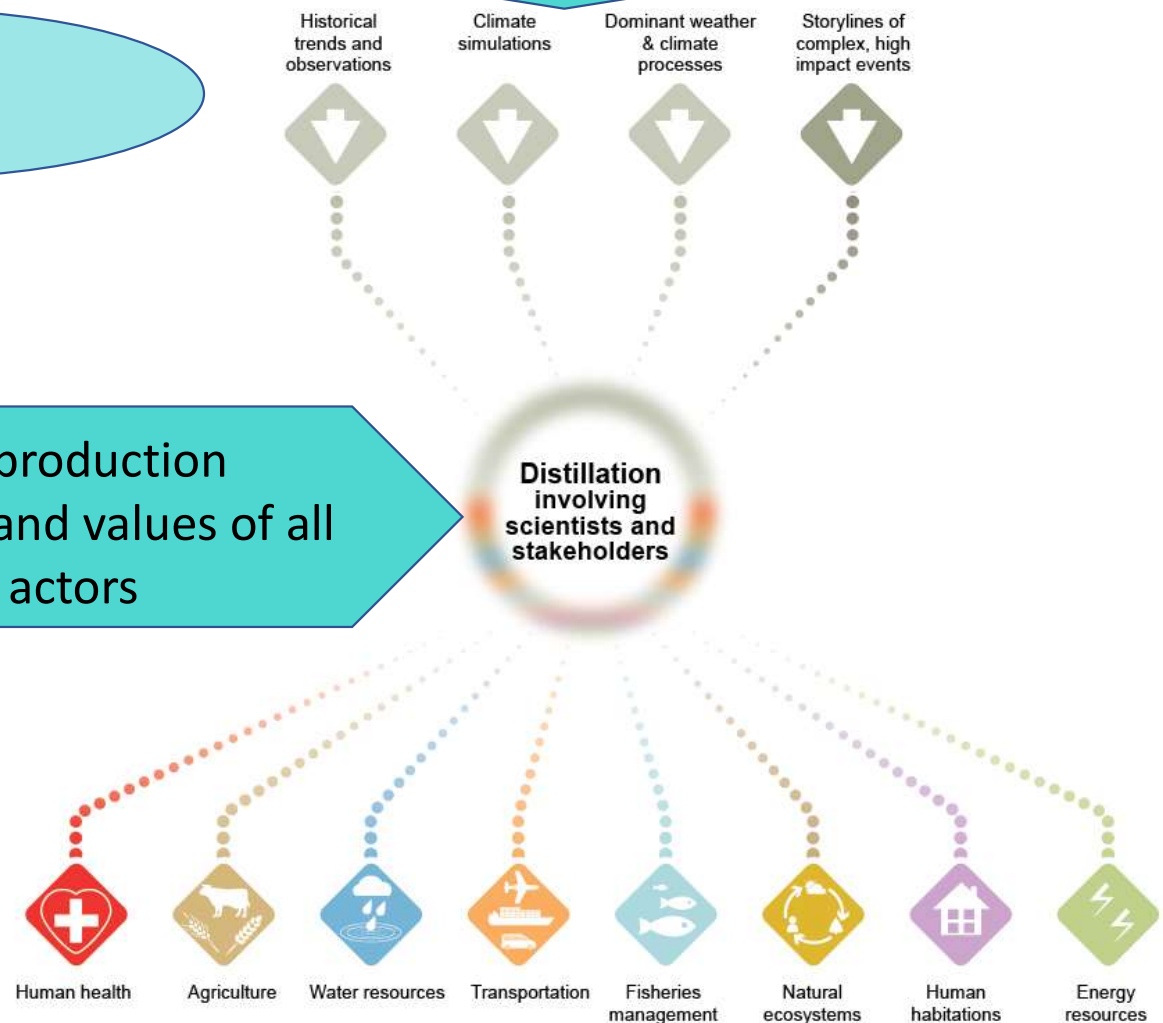
The Distillation Process

Construction of Information Fitness for purpose

Sources of
information

Co-production
Context and values of all
actors

Information that can
be integrated in
decision-making in
society



Context and **Values** in the assumptions and choices... of the scientist when resolving a society-relevant problem

I only have 40T of disc space!
Which scenario do I use?

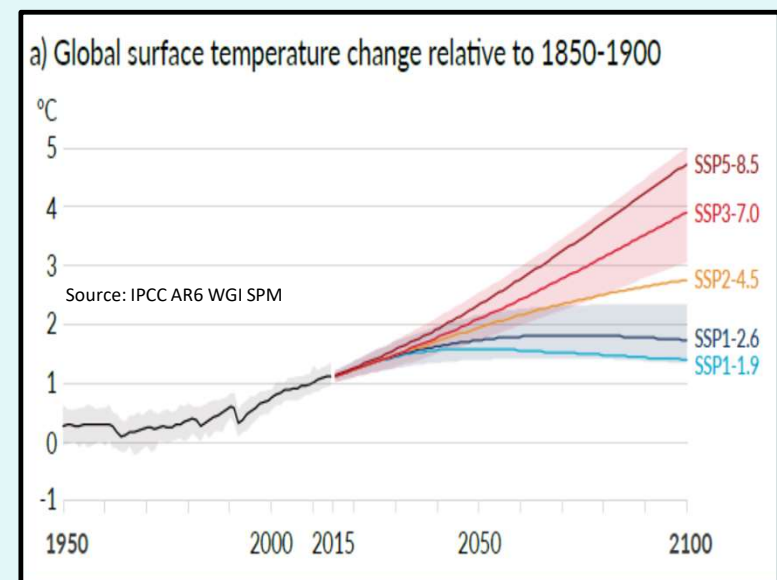
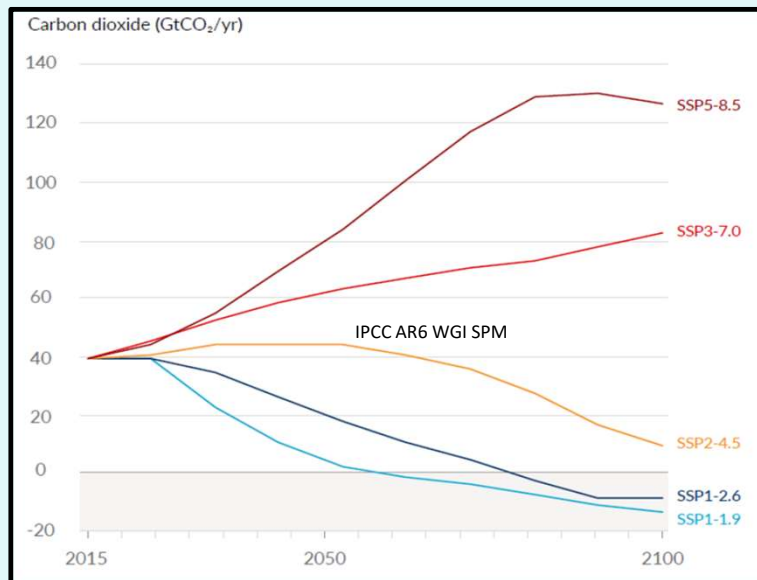
CONTEXT



Context and *Values* in the assumptions and choices... of the scientist when resolving a society-relevant problem

I only have 40T of disc space!
Which scenario do I use?

CONTEXT



Example created to visualize concepts of Ch10,
illustrations not part of Ch10

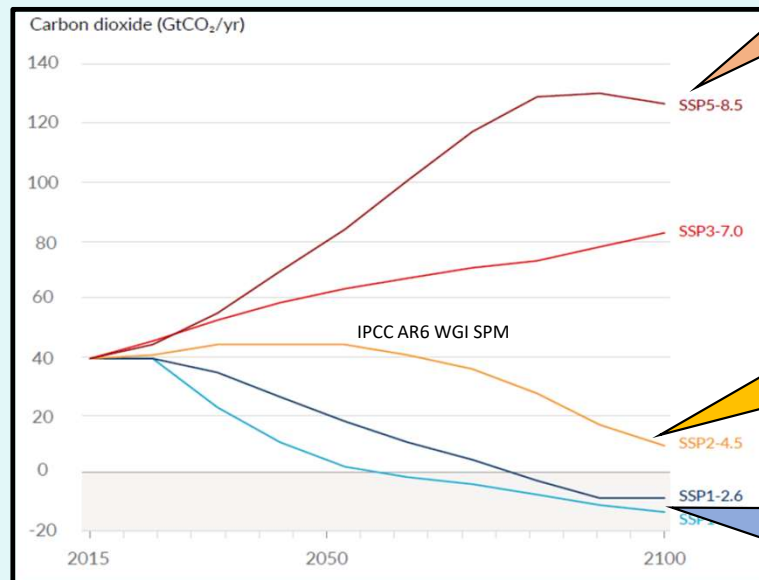
Context and Values in the assumptions and choices... of the scientist when resolving a society-relevant problem

I only have 40T of disc space!
Which scenario do I use?

CONTEXT

VALUE

'Traditional' climate scientist:
"Strong regional climate change
signal in the climate model!!"



Global surface temperature change relative to 1850-1900

°C

5

4

0

-1

-2

-3

-4

-5

-6

-7

-8

-9

-10

VALUE

'Prudent' climate scientist:
"Safest to use middle-of the road-
scenario?
Isn't it more likely than the others???"

VALUE

'Politically engaged' climate scientist:
"Include scenarios consistent with Paris
Agreement!!"

Concepts of Ch10,
illustrations not part of Ch10

Other areas where choices are influenced by context and values

Other areas where choices are influenced by context and values

Selection of sources of information (for construction of information)

- Types of observations (in situ, gridded, satellite)
- Global / Regional / Convective Permitting Climate Models
- Statistical downscaling
- Process understanding
- Attribution
- User knowledge, indigenous knowledge

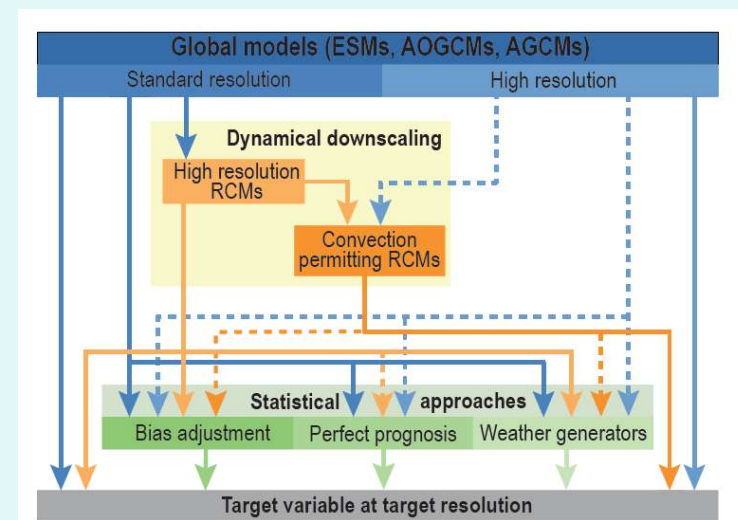


Figure 10.5 | Typical model types and chains used in modelling regional climate. The dashed lines indicate model chains that might prove useful but have not or only rarely been used. Hybrid approaches combining the model types shown have been developed.

Other areas where choices are influenced by context and values

Selection of sources of information (for construction of information)

- Types of observations (in situ, gridded, satellite)
- Global / Regional / Convective Permitting Climate Models
- Statistical downscaling
- Process understanding
- Attribution
- User knowledge, indigenous knowledge

Fitness for Purpose

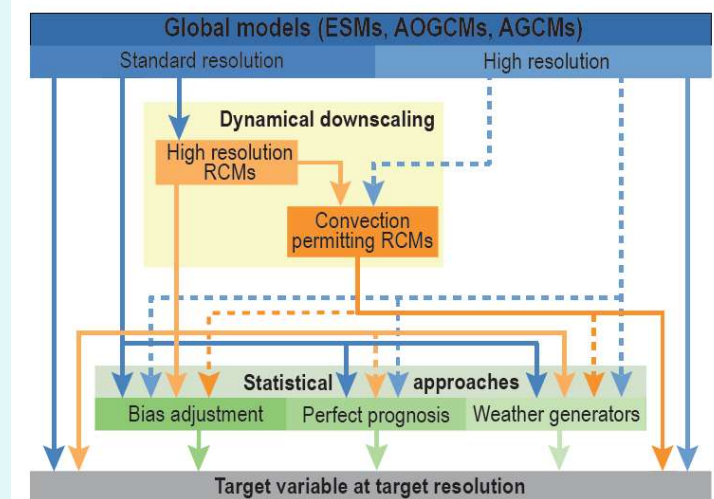
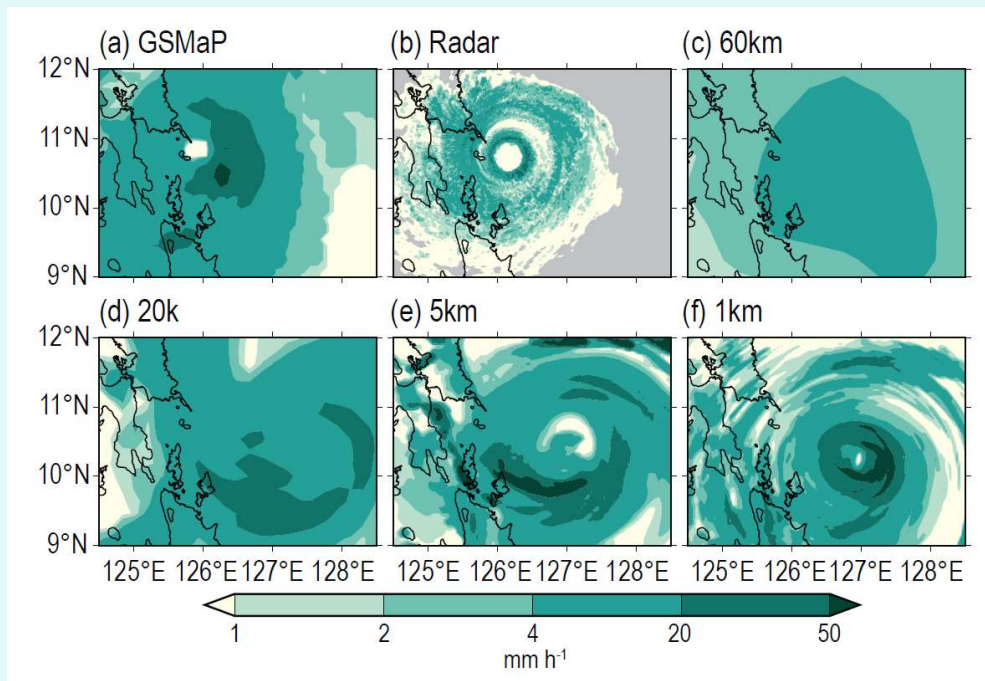


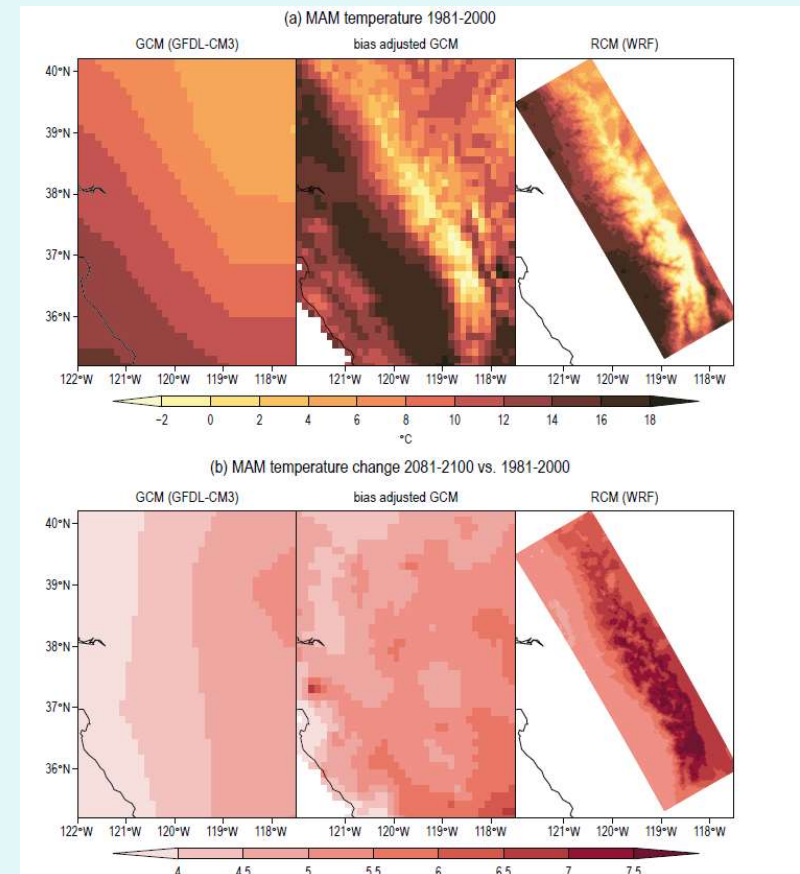
Figure 10.5 | Typical model types and chains used in modelling regional climate. The dashed lines indicate model chains that might prove useful but have not or only rarely been used. Hybrid approaches combining the model types shown have been developed.

Fitness for Purpose

Hourly accumulated precipitation profiles (mm hour^{-1}) around the eye of Typhoon Haiyan



Snow–albedo feedback is not represented by the bias adjustment - local temperature trends in high altitudes are under-represented



Distillation of context relevant regional information

Distillation:

Exploration and reconciliation
of different sources of information




Assessing the fitness of different
sources in the given context




Integrating different sources into
a broader picture within a context

Distillation of context relevant regional information

Distillation:
Exploration and reconciliation
of different sources of information



Assessing the fitness of different
sources in the given context



Integrating different sources into
a broader picture within a context

EXAMPLES

- Intercomparison of different sources of information, and identification of potentially conflicting results.
- Reconcile conflicting results.
- Assessing the interdependence of chosen models to identify the amount of independent information.

Distillation of context relevant regional information

Distillation:
Exploration and reconciliation
of different sources of information

Assessing the fitness of different
sources in the given context

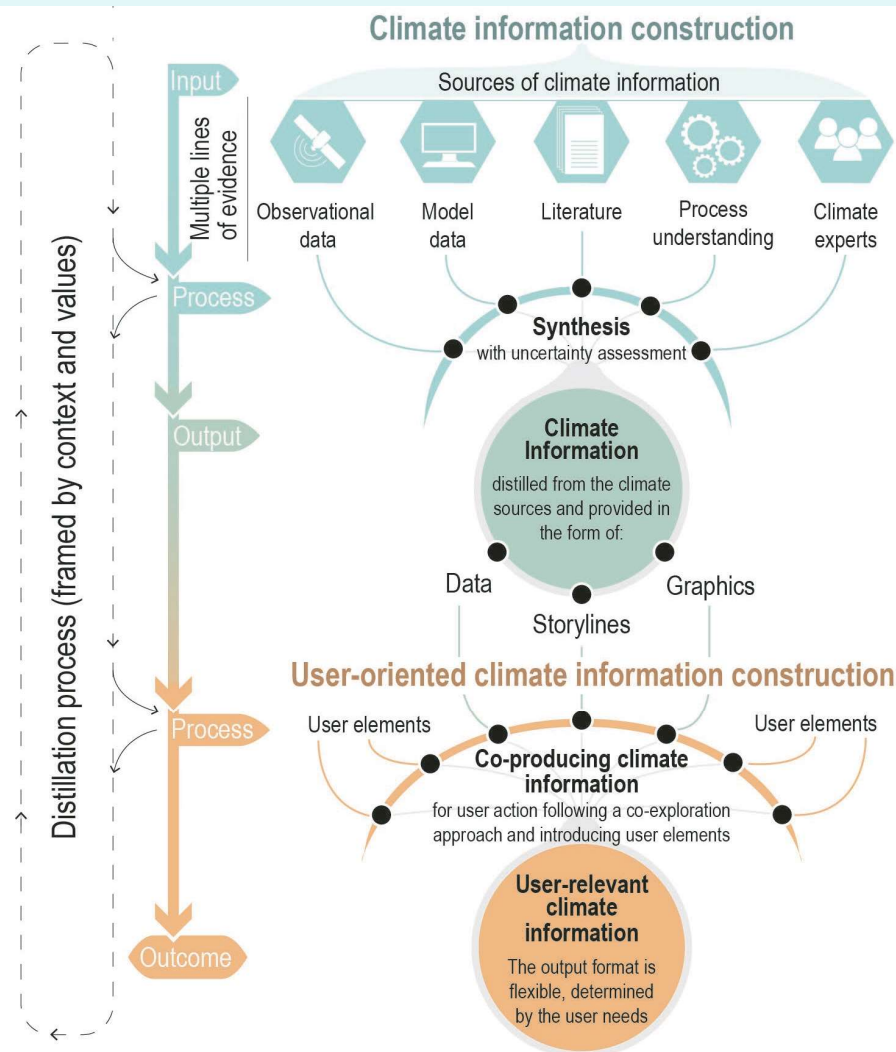
Integrating different sources into
a broader picture within a context

EXAMPLES

- Intercomparison of different sources of information, and identification of potentially conflicting results.
- Reconcile conflicting results.
- Assessing the interdependence of chosen models to identify the amount of independent information.

Translate the information explicitly into the user context
+ linking it to experience
+ formulating a narrative
+ by highlighting the relevance for the user context

Climate information construction

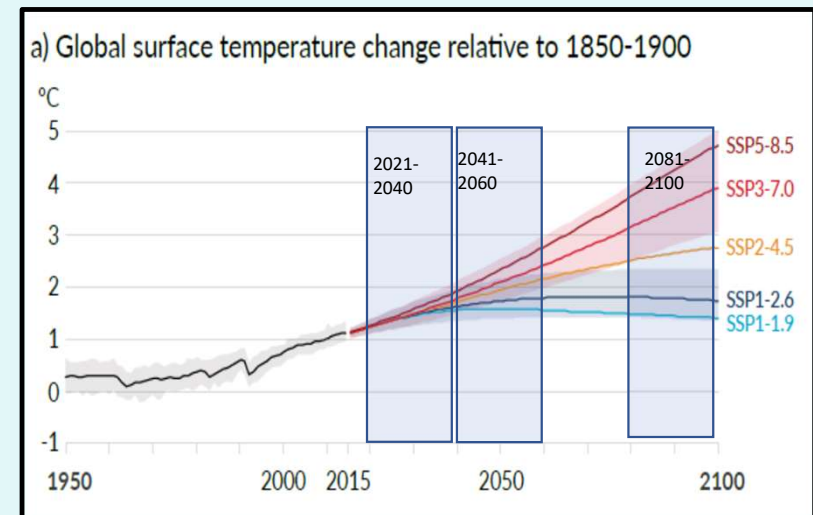


Other areas where choices are influenced by context and values

1. Selection of sources of information

- Types of observations (in situ, gridded, satellite)
- Global / Regional / Convective Permitting Climate Models
- Statistical downscaling
- Process understanding
- Attribution
- User knowledge, indigenous knowledge

2. Spatial and temporal scales



Other areas where choices are influenced by context and values

1. Selection of sources of information

- Types of observations (in situ, gridded, satellite)
- Global / Regional / Convective Permitting Climate Models
- Statistical downscaling
- Process understanding
- Attribution
- User knowledge, indigenous knowledge

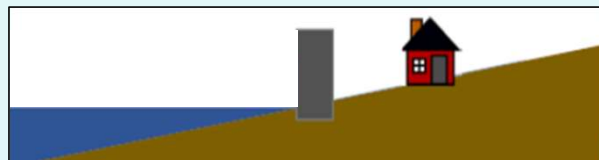
2. Spatial and temporal scales

3. Prioritize avoiding “type 1 errors” (false alarms) or “type 2 errors” (missed warnings)

4. ...

5. ...

Unnecessary interventions: time
and money “wasted”



Preservation of the status quo while
an intervention was needed

