



ARCTIC OCEAN
SCIENTIFIC ADVENTURES

EDUCATIONAL PACKAGE

NO.11

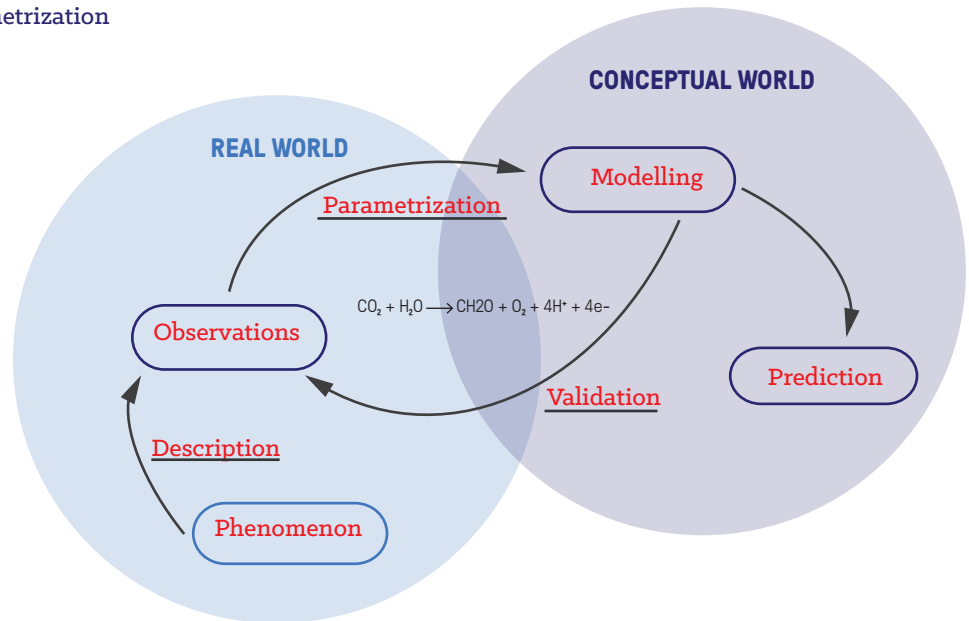
Mathematical
models

GENERAL NOTIONS

Complete the drawing using the following words to describe a mathematical model.

Modelling
Description
Observations
Parametrization

Predictions
Phenomenon
Validation



Complete the following sentence

conditions model theory predicts
representation observations phenomenon

A **model** is a simple **representation** of a complex **phenomenon**. It allows elaboration of a **theory** based on **observations** and **predicts** what would happen under certain **conditions**.

MODELLING IN THE GREEN EDGE PROJECT

Why use models in the GreenEdge mission ?

• **Lack of knowledge** : Research has been very limited in the Arctic and it is becoming important to develop models specific to this environment.

• **Anticipate expected changes in the future** and validate these models using data collected in the field

What are the 4 major components studied in modelling natural science processes in the GreenEdge project ?

- Ocean
- Ice
- Snow
- Atmosphere

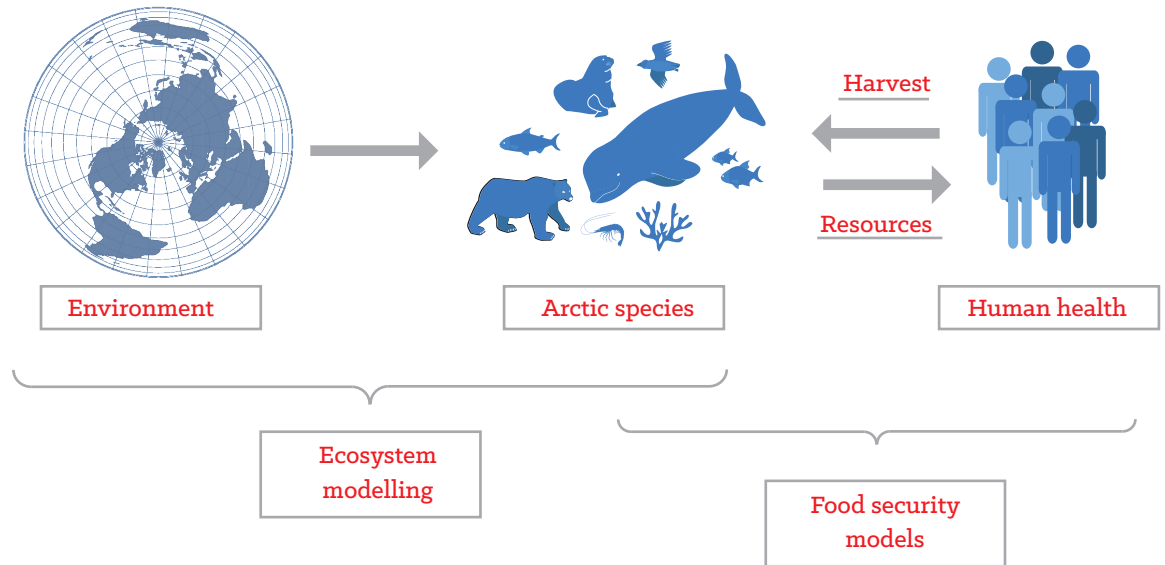
Caption this drawing with the following words

- Arctic species
- Harvest

- Human health
- Environment

- Resources
- Ecosystem modelling

- Food security models



ARCTIC ECOSYSTEM MODELLING

In order to model the Arctic ecosystem, scientists use coupled biological physical models.

What is the major objective of biological models in GreenEdge ?

The aim is to evaluate biomass transfer within the trophic network during the summer season and reconstruct the network processes.

Why couple these two types of models ?

Living organisms studied using biological models are also affected by physical parameters in their environment and these parameters vary over time (nutrients, temperature, light, ice cover, ocean currents...)

Physical models developed in GreenEdge are validated using observational data collected in the field using different instruments.

Match each instrument to its definition.

Measures speed current

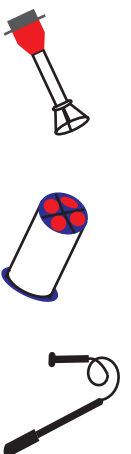
Measures water turbulence

Measures conductivity, temperature and depth

CTD probe

Current meter (ADCP)

SCAMP



FOOD SECURITY MODELS

The aim is to develop a participative model connecting environmental changes with food security and health issues among Inuit populations.

What is a “participative model” ?

It is a model that includes the parties involved (population and decision makers) in modelling processes.

What are the interests of this kind of project ?

1. Collective learning to build consensus and avoid conflicts.
2. Knowledge inputfor rework informed decision making

3. Improving the legitimacy of decision-making.
4. Improving scientific knowledge of all the participants.

