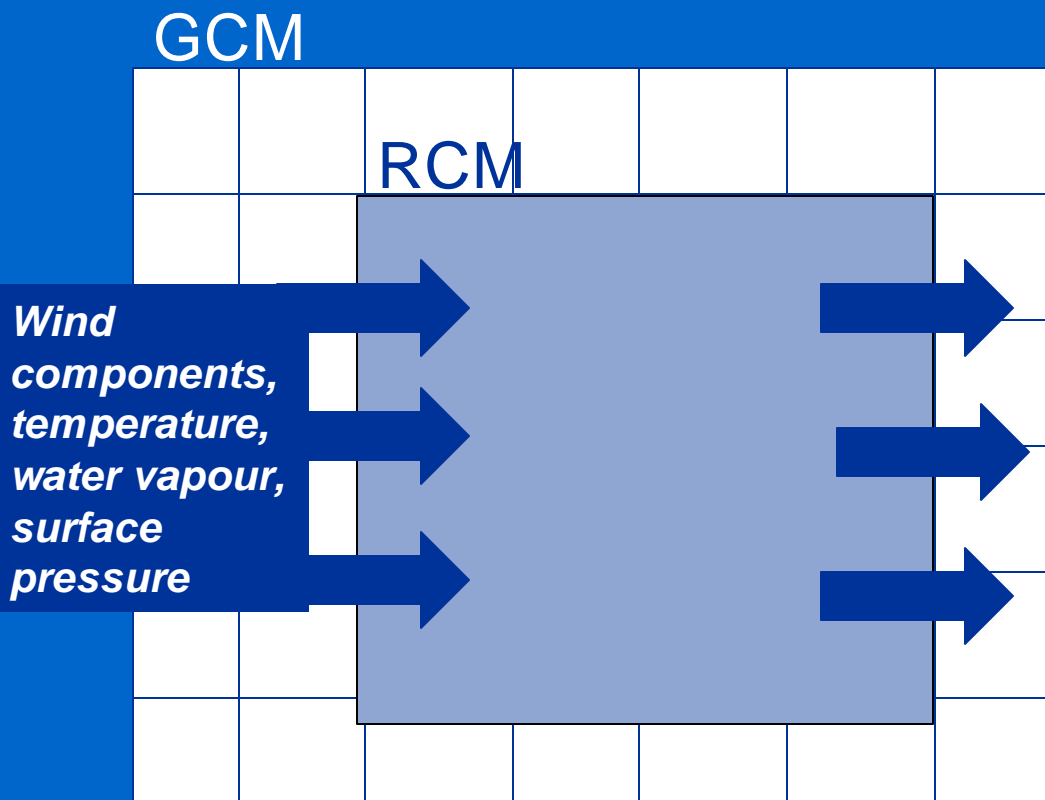


# Introduction to Regional Climate Models (RCMs)

# GCM-RCM interaction

Coarser resolution GCM provides initial and lateral boundary conditions to drive RCM



Higher resolution RCM is nested in the GCM and provides mesoscale information

One-way nesting

Two-way nesting

# Nested GCM-RCM development

For viable regional climate change experiments three conditions must be fulfilled:

- the GCM climate must be realistic over the region of interest
- model resolution has to be high enough to capture the basic mesoscale forcings of relevance and its domain large enough to allow the full development of mesoscale circulations
- model domain has to be large enough to prevent the coarse-scale lateral boundary conditions from dominating the solution over the RCM area, but small enough to prevent its circulation from departing far from that of the driving GCM, otherwise physical consistency between the GCM solution is not maintained

# RCMs

## ADVANTAGES

- ability to simulate smaller-scale atmospheric features, e.g., orographic precipitation
- they respond in a physically consistent way to different external forcings, e.g., atmospheric chemistry changes

## DISADVANTAGES

- they are generally computationally expensive
- they are dependent on the driving GCM and so affected by any systematic errors in the driving fields
- a restricted number of experiments and ? a limited number of scenarios