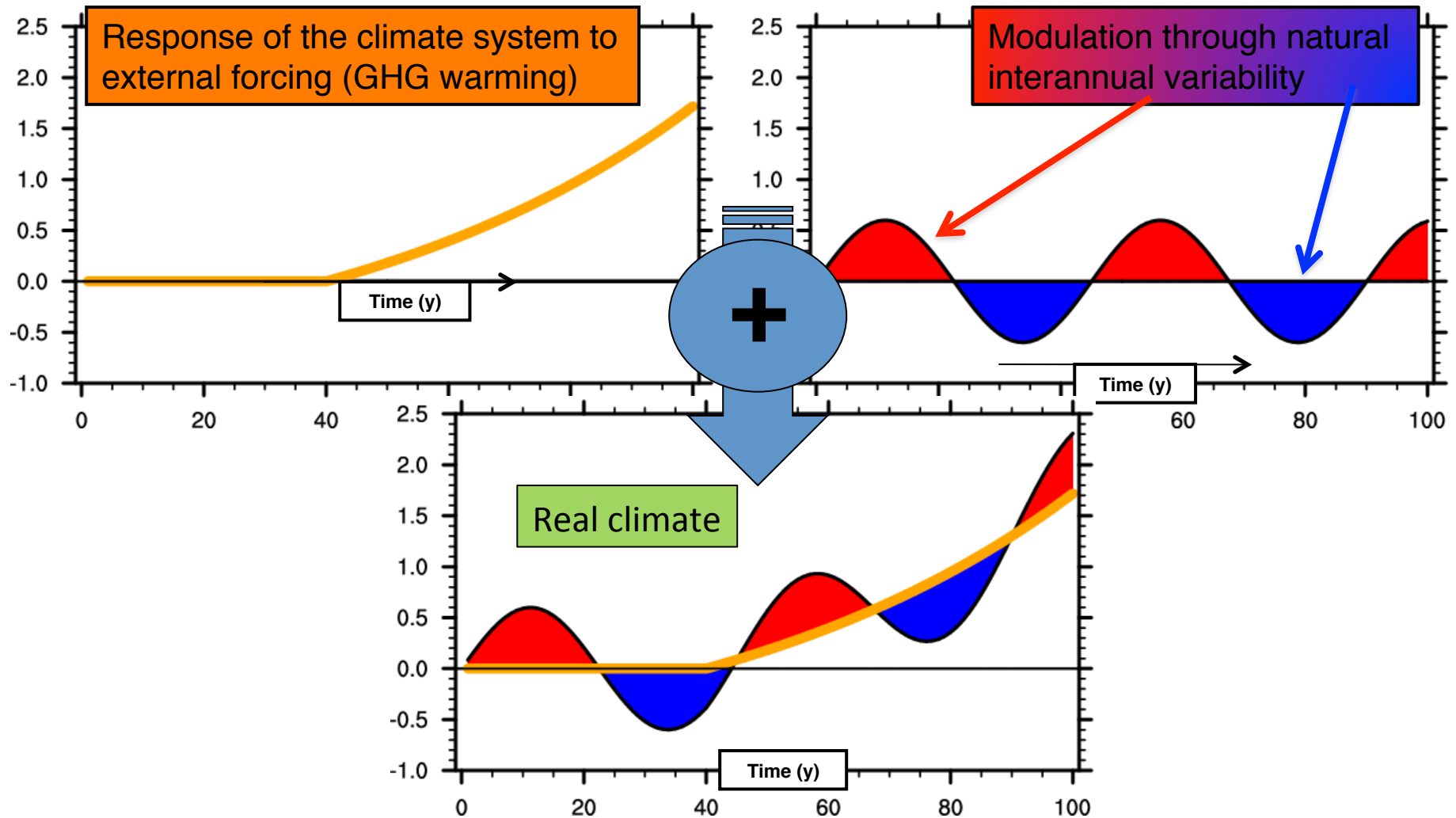


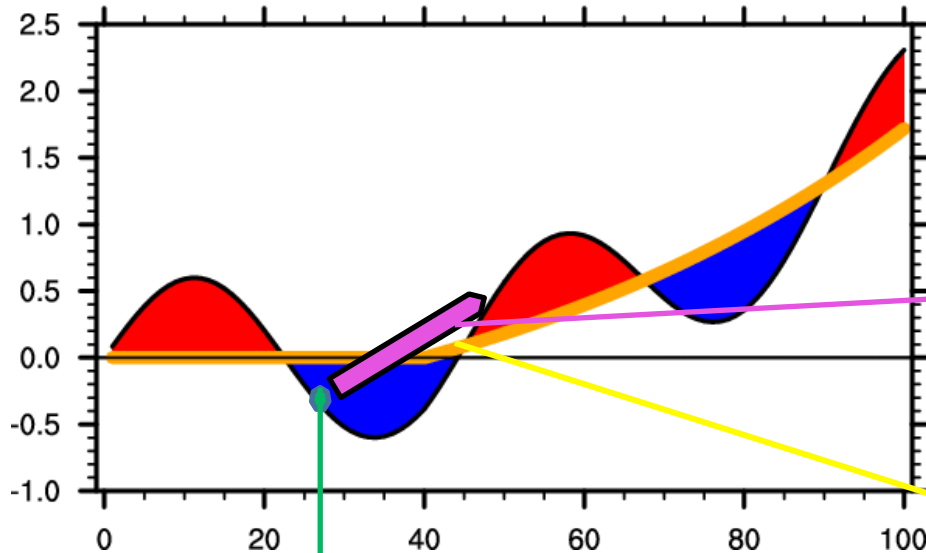
On some future developments of climate simulation

1. Toward climate forecasting (1/2)



On some future developments of climate simulation

1. Toward climate forecasting (2/2)



Initial condition for the coupled ocean-atmosphere climate system
- processing oceanic data (modest increase)
- assimilating in a coupled system

X 5-10

Advance in time,
regularly updated

X 10-100

Chaotic behavior of internal variability
- ensemble simulations instead
of single deterministic simulation

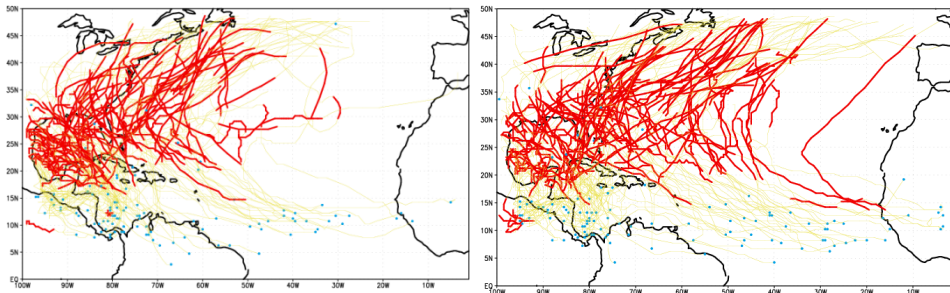
X 10-50

On some future developments of climate simulation

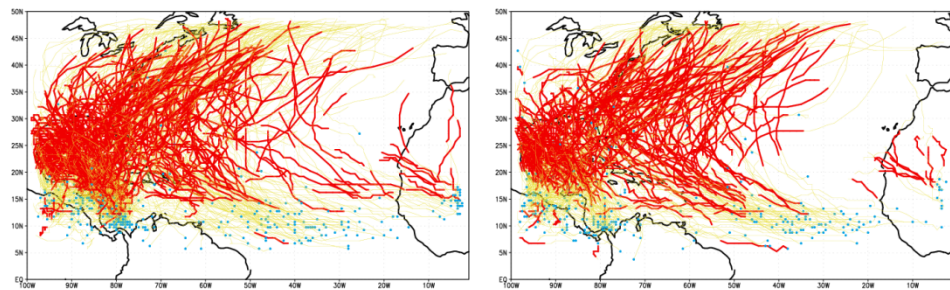
2. Toward numerical convergence ? (1/2)

Actual paradigm for climate simulation: decrease the resolution [with possible modification of the subgrid-scale parameterizations] to achieve better agreement with observations

Comparison of results may show erratic behaviour of the simulations at different spatial resolutions



Lower resolution: actual 109/dec => future 120/dec

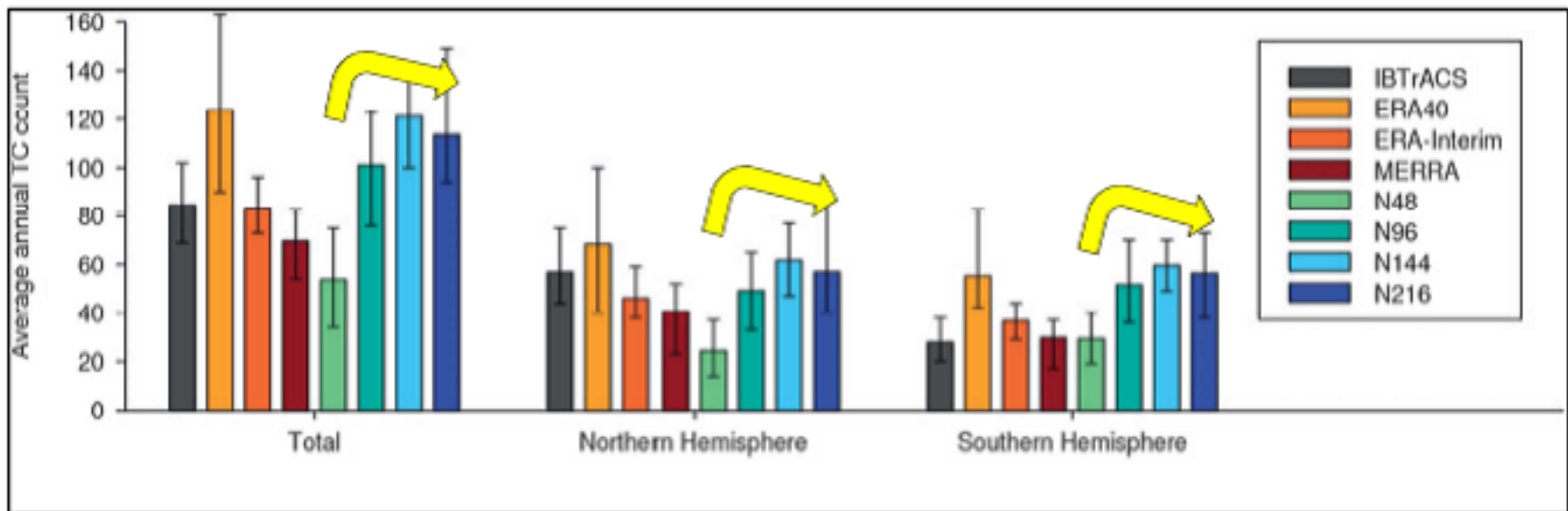


Higher resolution: actual 125/dec => future 95/dec

Impossibility to infer from climate simulation whether or not cyclonic activity will increase under climate change !!

On some future developments of climate simulation

2. Toward numerical convergence ? (2/2)



Robustness (or «stability», or «pre-convergence») of climate simulations for the annual number of tropical cyclones as a function of horizontal spatial resolution. Yellow arrows emphasize still insufficient convergence when decreasing the spatial resolution from 270 km (N48, light green), to 135 km (N96, green), 90 km (N144, blue) and 60 km (N216, deep blue).

From Strachan et al. (2013).