Objective

Climate models of the sort used by the Intergovernmental Panel on Climate Change (IPCC) all predict global warming over the next century, but differ widely in their detailed predictions for any specific region of the globe. The state of the art is just to run the models separately and form a weighted average of their outputs. A new approach put forward by the applicant is that of “supermodeling”: instead of just averaging the outputs of the models, the models are allowed to influence each
other in run time. One must specify how much weight a given model gives to corresponding data in each other model. In a supermodel, the weights, or “connection coefficients” are given by a machine learning algorithm. That is one would use a collection of historical data to train the connections in the supermodel, so that the most reliable dynamical features of each model would be combined. Supermodeling is an instance of “chaos synchronization”, the phenomenon wherein chaotic systems can be made to follow corresponding trajectories by exchanging surprisingly little information.

In prior investigations with supermodels, it was determined that they are particularly useful for predicting variability, like that in the El Nino cycle in the Pacific. The proposed project would use a supermodel to predict variability in the Atlantic sector due to changes in the Atlantic Meridional Overturning Circulation (AMOC), which has a large effect on climate in the surrounding region on multi-decadal time scales. Existing climate models differ widely in their predictions for AMOC. The proposed application will require changes in the way supermodels are formed and trained so as to focus on the positions and gross characteristics of coherent structures such as ocean currents. The models that will be used to build the supermodel will be a) a collection of European models, and b) a combination of U.S. and European models from which a supermodel is already being built.

**Fields of science**

natural sciences › earth and related environmental sciences › atmospheric sciences › meteorology
natural sciences › computer and information sciences › computational science
natural sciences › earth and related environmental sciences › atmospheric sciences › climatology › climatic changes › el niño
natural sciences › computer and information sciences › artificial intelligence › machine learning
natural sciences › computer and information sciences › artificial intelligence › computational intelligence

**Programme(s)**

H2020-EU.1.3. - EXCELLENT SCIENCE - Marie Skłodowska-Curie Actions
H2020-EU.1.3.2. - Nurturing excellence by means of cross-border and cross-sector mobility

**Topic(s)**

MSCA-IF-2014-EF - Marie Skłodowska-Curie Individual Fellowships (IF-EF)
Call for proposal

H2020-MSCA-IF-2014

See other projects for this call

Funding Scheme

MSCA-IF-EF-ST - Standard EF

Coordinator

UNIVERSITETET I BERGEN

Net EU contribution

€ 196 400,40

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Norway

Region

Norge > Vestlandet > Vestland

Activity type

Higher or Secondary Education Establishments

Links

Contact the organisation Website Participation in EU R&I programmes HORIZON collaboration network

Other funding

€ 0,00

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