ICES: International Centre for Earth Simulation

Swiss based not-for-profit foundation

Public-Private Partnership

Neutral, independent, non-political, privately funded

Expert Committee + Ethics Committee

Next-Gen Climate and Geo-Modeling integrating:

natural sciences & socio-economic sciences

Sustained and dedicated HPC facility in Top10 WW

Partnering with national climate centers

Partnering with university research centers

Partnering with International Orgs & NGOs

Dedicating 25% of resources to developing world

ICES Goals & Objectives

- Models include convection, cloud & aerosol physics

- Include dynamic vegetation & deep ocean physics

- Improve grid resolution & fidelity of global models

- Improve error management & model uncertainties

- Improve parameterizations methods & insights

- Assimilate massive data streams from new space & in-situ sensor networks

- Integrate NWP & Climate Modeling methodologies

- Bridge seasonal/inter-seasonal, annual/inter-annual and decadal skills & capabilities

- Couple space weather & solar sciences with climate

ICES Next-Gen Computing Facilities

- Exascale performance (~10^{18} flops, ~10^{18} bytes)
- Co-designed hardware & software
- CPU-GPU hybrid architecture
- ~1 million cores, ~1 billion threads
- Massive shared memory & in-memory databases
- Hardware accelerated MPI calls
- New massively parallel programming languages
- Time-evolution modeling languages
- Computationally steerable software stack
- 'Scientist-in-the-loop' immersible interactivity
- 4D glasses-free visualization