Advanced visualisations

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High-definition visualization of high-resolution global climate simulations
The Nihon-UK Global Environmental Model (NUGEM), co-developed by the UKMO Hadley Centre and by NERC's NCAS CGAM, is an N216 (0.83ox0.56o, corresponding to ~60 km in mid-latitudes) version of Hadley Centre's HadGEM1 model, successor to the famous HadCM3. HadGEM1 is normally run with an atmospheric resolution of (1.88ox1.25o, ~160 km in mid-latitudes) and was recently integrated for hundreds of years within the framework of IPCC AR4. NUGEM is being developed in the context of the UK-Japan Climate Collaboration (UJCC), which was launched in 2005 and allows UK climate scientists to exploit the power of the Earth Simulator supercomputer. NUGEM is part of a broader UJCC group of models, developed to systematically explore the role of resolution: starting with the base N96 AOGCM (HadGEM1), we have set up an array of coupled and uncoupled models, in order to test hypotheses about the importance of increasingly resolving the fundamental elements of climate.

What you see in the NUGAM movie:
The fully coupled model was "spun up" at lower resolution for several decades and initial conditions were created for the atmospheric model (NUGAM), which was then run for ten years. What you can see in this animation is one full year of simulation, stored at hourly intervals. Several elements of the Earth System have been represented with different colors and textures:

- white-grey clouds: integrated frozen-liquid water in the column (simulated);
- blue-red colour scale: simulated precipitation (light to intense);
- indigo masses, near the two Poles: Sea Ice (imposed);
- white texture on land: snow cover (simulated);
- background: "Blue Marble" landscape;
- Sun icon: location of the Sun at zenith (local noon), which is useful in accompanying the diurnal cycle.

The animation shows the deep mid-latitudes clouds which are embedded in the Westerly flow and organized into large scale weather systems (e.g. around cyclones). Tropical clouds (near the Equator) are smaller in size and also less spatially organized, although the diurnal cycle of convection is well visible over Amazonia and central Africa, also marked by precipitation. Weather fronts are visible in the proximity of regions with cyclonic rotation (anti-clockwise in the Northern Hemisphere and clockwise in the Southern Hemisphere), also distinguishable by elongated areas of precipitation. Tropical cyclones are spawned in the vicinity of the Equator and at times develop into hurricanes or typhoons (watch for the "eye" signature). Snow cover and sea ice evolve on a slower time scale, being more properly associated with the annual cycle and the progression of seasons. It is interesting to notice, however, the strong interaction of large scale weather systems with land, depositing snow in the cold seasons, especially over high elevations.