

“Focussing the Macroscope: Tracking the Earth System’s Vital Signs”.

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"The COP21 agreement in Paris committed 195 nations to reducing their carbon emissions to limit global warming to well below 2degC, and to achieve 'net zero' carbon dioxide emissions in the latter part of this Century. Progress will be reviewed every five years starting in 2020. In the meantime, the signals of the climate change already under way are emerging ever more strongly from the noise of natural variability. The climate science community is thus confronted with several challenges. Firstly, given that the Earth is the most complex system we know of, there remains much to be done to understand its functioning. This is especially the case whilst the planet transitions into new and previously unexplored operating states, with the possibility new modes of operation developing. Secondly, the community will need to identify the planet's 'vital signs' , much like a medical patient, and to monitor their evolving trajectories, both as a fundamental measure of planetary 'health', but specifically to inform the 5 yearly review cycle of the COP. Thirdly, the community need to develop and exploit indicators of climate-change-related risks to human prosperity and wellbeing. To achieve these ends, a comprehensive, carefully targeted, reliable and appropriately sensitive operational observing system will be required. This the Global Climate Observing System needs to provide."