

# **Climate change and Climate variability: From Global to Regional on Science, Impacts, Solutions and Challenges**

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## **Abstract**

Climate change has been recognized as the greatest challenge that humanity will be facing in the 21<sup>st</sup> century. A combined effect of climate change and climate variability would exert much more damaging consequences if the world fails to mitigate the emission of greenhouse gasses. This paper highlights key findings of the Fifth Assessment Report (AR5) of the Inter-governmental Panel on Climate Change (IPCC) on the science, impacts and mitigation effort that is required to halt and slow down climate change. As to support the IPCC AR5 recommendation, the Paris Agreement was established under the United Nations Framework Convention on Climate Change (UNFCCC) as a concerted effort by countries in the world to systematically and collectively reduce the global emission, and limit the warming under 2°C. However, recent publications seem to suggest that Paris Agreement is unlikely to succeed in which the estimated likelihood for achieving the 2°C (1.5°C) target is only about 5% (1%). This paper will also highlight future projections of climate over Maritime Continent based on the Southeast Asia Regional Climate Downscaling (SEACLID)/CORDEX Southeast Asia, a project under the auspices of the World Climate Research Programme (WCRP) of the World Meteorological Organization (WMO). Highlights in terms of combined effects of climate change and climate variability over Indonesia and Malaysia will be discussed. For example, Malaysia and Indonesia are projected to become much drier for months of June to November in future periods. Much more drier condition is likely when El Niño occurs in future periods, creating a much more severe condition than those already experienced during major El Niño. The challenge is what actions these countries must take to avoid severe impacts of future periods?