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MarXiv Summary

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Marine ecosystems will soon start to feel the effects of climate change

The effects of climate change can be perceived when the *signal* of human-altered climate is louder than the *noise* of natural climatic variations. The point at which the signal outweighs the noise is called the time of emergence (TOE). If the signal of climate-change is predicted to be statistically greater than the noise in, for example, 20 years, you would say the TOE is 20 years. In this example, in 20 years from now, one would be expected to legitimately notice an altered climate. Using climate models under a high-emission scenario, the authors predicted the TOE for perceivable changes in temperature and precipitation for a variety of both marine and terrestrial habitats, and major population centers.

The frequency of extreme heat events will be felt globally before 2050, with the median in the 2020s, indicating roughly half the planet is already taking notice. Lower latitudes are expected to notice the changes 2-3 decades earlier than mid-latitudes.

WWF's terrestrial and marine ecoregions were used as a base map on which to overlay the TOE forecasts. See figures three and four of the full article for these maps (pages 32 and 33 of the PDF in MarXiv). "TOEs of severe and frequent hot extremes are projected to occur prior to 2050 for all terrestrial biomes and marine realms". Over half of all terrestrial biomes and marine realms will notice drought before 2100. "For oceans, Tropical Atlantic, Indo-Pacific, and Tropical eastern Pacific would be vulnerable to hot extremes, and high-latitude marine realms to precipitation extremes."

By 2050, 20% of urbanites will feel the effects of extreme heat events, 38% will experience severe droughts, and 6% will see heavy rains. "All urban residents will encounter perceivable changes in the frequency and severity of hot extremes prior to 2030." Developing countries will feel the effects of extreme climate events before more developed countries.

The maps developed by the authors may be especially useful for conservation planning, particularly with regard to the placement of marine protected areas, which should plan for species to move based on the changing climate.

This is a summary of: Projected timing of perceivable changes in climate extremes for terrestrial and marine ecosystems

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