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Assessing Coastal Vulnerability in New York City: The Impact of Sea Level Rise

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Global mean sea level rise (SLR) in the 20th century averaged 1.5–1.6 mm/year, but has doubled to ≥3 mm/year since 1993. Since 2000, ice sheets have followed the upper range of IPCC projections, with glaciers and ice sheets now the primary contributors to SLR. In New York City (NYC), the mean 20th-century SLR of 2.8 mm/year surpasses the global average due to a combination of ice mass loss, thermal expansion, and geophysical factors. Several low-lying NYC neighborhoods particularly those around Jamaica Bay in Queens already face more frequent flooding from storms and monthly high tides.

In 2015, the New York City Panel on Climate Change (NPCC) projected a 1.91 m SLR (90th percentile) by 2100, raising the annual likelihood of a current 100-year flood to 12.7% by the 2080s. In 2019, NPCC introduced a low-probability, high-impact scenario (ARIM) forecasting up to 2.06 m by the 2080s and 2.9 m by 2100. Such rises could result in daily flooding or even permanent inundation in some areas.

While NYC has adopted adaptation and resiliency measures aligned with the latest climate science, current waterfront plans primarily address the coming decades—not the more extreme sea levels expected later in the century. To enhance adaptive capacity, further investments, public education, cost-benefit analyses of long-term strategies, and planning for potential relocations will be essential not only in NYC, but in other coastal cities facing similar threats.

Biography

Vivien Gornitz received her Ph.D. from Columbia University in geology and subsequently become involved in climate change studies. Her current research focus is on impacts of sea level rise on urban coastal flooding. She has been a contributing author to the IPCC, NPCC, and UCCRN. She has also edited the Encyclopedia of Paleoclimatology and Ancient Environments, written Vanishing Ice: Glaciers, Ice Sheets and Rising Seas; Rising Seas: Past, Present and Future, in addition to numerous scientific papers.