Climate Projection Ensembles, Climate Change Distributions, and the relevance of Low Frequency Variability

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Abstract:

The process of incorporating climate change information into long-term water resources planning requires decisions on (1) which climate projections to use and (2) how to use them when developing planning assumptions that reflect future climate. Broadly speaking, planning assumptions relate to portrayal of water supplies, water demands and operations constraints in water resources management studies, or portrayal of hydrologic hazard possibilities in infrastructure safety and flood risk reduction studies.

This presentation introduces several issues and questions that complicate the two decisions listed above. On the first decision, should all projections be regarded as eligible for planning use, or can we rationalize throwing? Does our sense of climate projection uncertainty change if we go ahead and do so? On the second decision, after we've decided which projections to retain, what aspects of projected climate do we want to reflect into planning assumptions? Do we wish to map the time-developing aspects of the climate projections to associated projections of hydrology (e.g., time-changing probabilities of droughts or surplus occurrence)? Or do we only wish to only sample the projections for changes in period-climate (e.g., 30-year climate norms)? The latter path has been demonstrated many times in research literature and in recent planning practice. However, the matter of low-frequency variability affects interpretation of projected changes in 30-year climate: are these sampled changes "climate change" or "a blend of climate change and natural variability"? Answers to these questions have implications for characterizing hydrologic and water management impacts, and associated adaptation needs.