Assessing and communicating uncertainty in decadal climate predictions: Connecting predictive capacity to stakeholder needs

Rebecca E. Morss, James M. Done, Heather Lazrus, Erin Towler, and Mari R. Tye
The Potential Value of Decadal Prediction

Variations Webinar  Sept 6, 2018
The Approach

What climate-related information is skillful on decadal time scales?

Global prediction

Regional/local prediction

Climate-related impact prediction

Intersection of predictive capacity with stakeholder needs

Communication of decision-relevant predictive information and uncertainties

Climate-related decision space

Regional/local decision maker

Application sector

What climate-related information is needed on decadal time scales?
## What is Needed?

### Colorado

<table>
<thead>
<tr>
<th>Urban Drainage Flood Control District.</th>
<th>Stormwater drainage.</th>
</tr>
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<tbody>
<tr>
<td>Built versus natural channel construction?</td>
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<tr>
<th>Denver Water.</th>
<th>Drinking water supply.</th>
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<tbody>
<tr>
<td>If we’re in a drought, when will we come out of it?</td>
<td></td>
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### California

<table>
<thead>
<tr>
<th>Sonoma County Water Agency.</th>
<th>Drinking water quality.</th>
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<td>How often will organic carbon exceed threshold at chlorination intake?</td>
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<th>California Department of Water Resources.</th>
<th>Drought prediction.</th>
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<td>How often will 8-river index fall below a minimum threshold?</td>
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</table>

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Decadal Conditioning of Atmospheric Rivers

10-member ensemble simulations of the 2016/2017 winter under opposite phases of the Interdecadal Pacific Oscillation (IPO).

+IPO SST Anomaly

-IPO SST Anomaly
Winter Precipitation Change under +IPO

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+IPO drives twice the number of strong events into southern California

At 33N, 125W
Predictions of warmer and drier winters for the US Southwest Region.

Salvi et al. (2017)
Statistical-Dynamical Prediction of US Precipitation

• Model US precipitation on Pacific Ocean temperature patterns.

• May outperform raw precipitation predictions from global models.

Hewitt et al. (2018)
What are the Key Characteristics of Useful Information?

• Finding intersections of skill and need is insufficient.

• Test prototype presentations of predictive information.

• Do predictions narrow the uncertainty compared to projections? And how is this useful?

Figure source: Jorge Arango