

## **SESSION: (B1) Mechanisms of S2D predictability**

**(B1-05)**

### **The Pacific Decadal Precession: Our current understanding of its dynamics, regional climate effects, and predictability**

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Events of recent years highlight the profound impact of decadal-scale climate shifts upon physical, biological and socioeconomic systems. Previously, research to understand, anticipate, and prepare for the regional effects that accompany decadal-scale climate shifts invoked well-known modes of decadal climate variability and change—e.g., the Atlantic Multidecadal Oscillation (AMO), the Pacific Decadal Oscillation (PDO), and the North Pacific Gyre Oscillation (NPGO). Here we will discuss the sources and physical processes giving rise to a recently revealed mode of decadal climate variability termed the Pacific Decadal Precession (PDP), a ~10-year counter-clockwise progression of an atmospheric pressure dipole around the North Pacific. During its progression, the PDP has teleconnected links to multiple climate extremes including: sustained droughts across the western and central US; enhanced fire severity in Alaska and California; the propensity for more frequent cold extremes over the eastern US; and the formation and persistence of prolonged marine heatwaves in the Northeast Pacific. Further, it has signatures that extend from the tropical Pacific subsurface through to the Arctic stratosphere. In this talk we will characterize the PDP's local and teleconnected interactions with, and impacts on, multiple earth system components, including atmosphere, ocean, terrestrial, and cryospheric systems. We will also analyze and diagnose the underlying phenomena and processes that sustain the PDP and its regional climate effects. Finally, we will start to examine which components of the PDP's evolution are statistically and/or dynamically predictable; which regional-scale effects are impacted by these predictable components; what oceanic, atmospheric, and/or terrestrial conditions sustain these predictable components; and what underlying processes are fundamental for generating these predictable components. Overall, understanding the sources and physical processes giving rise to the predictability of the PDP's evolution will provide valuable information to many communities and allow them to anticipate and prepare for the social, economic, environmental impacts of its decadal- and regional-scale climate effects.