

**DOTHISTROMA NEEDLE BLIGHT AND CLIMATE VARIABILITY –
A STORY TOLD THROUGH TREE-RING ANALYSIS.**

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Recent studies on Dothistroma needle blight have suggested that climate change may be responsible for unprecedented levels of Dothistroma outbreaks in northwest British Columbia (Woods et al 2005; Welsh and Lewis 2007). To investigate these claims further, this study used a suite of linear statistics to explore the influence of climate-forcing mechanisms on Dothistroma outbreaks.

We applied three low-pass filters to weather data from the Smithers airport, located in northwest British Columbia. Each filter scanned for conditions, between April and September, when both precipitation occurred, and when daily maximum temperatures were above 16° celsius. This data was combined with climate indices for El Nino-Southern Oscillation, the Pacific Decadal Oscillation, the Aleutian Low Pressure Index, the Arctic Oscillation and the North Atlantic Oscillation from 1950 to present.

A sequential series of statistics were performed to investigate atmospheric influences and/or climate-forcing mechanisms on temperature, precipitation, modelled Dothistroma outbreak conditions (warm, wet days between April and September) and actual regional Dothistroma outbreaks, as determined through tree-ring analysis.

Positive phases of El Nino-Southern Oscillation (El Nino) and Pacific Decadal Oscillation were each demonstrated to produce warm-wet conditions during summer months. Each was found to be significant for Dothistroma outbreaks conditions, and again for actual regional Dothistroma outbreaks.

We suggest that the recent, and unprecedented, Dothistroma outbreaks in the Kispiox Valley, British Columbia are a result of a coupled ecosystem-atmosphere teleconnection whereby Dothistroma outbreaks respond coherently to the state of the north Pacific. Specifically, increasingly intense positive PDO and ENSO events are suggested to result in an increased frequency of warm-wet conditions during summer months, and therefore increased occurrences of Dothistroma needle blight outbreaks.