**Falk et al., “Multiscale controls of historical fire regimes: New insights from fire-scar networks.”**

**Supplemental Information**

1. Panel S1: The International Multiproxy Paleofire Database (IMPD).
2. Panel S2: Additional considerations in inference from the tree-ring record.
3. Supplemental References

Supplemental Panel S-1. The International Multiproxy Paleofire Database (IMPD).

The IMPD, established in 2003, is a free public online database of fire history chronologies from tree-ring and charcoal proxies and their associated metadata. The IMPD is managed by the National Oceanic and Atmospheric Administration (NOAA) Paleoclimatology Program and hosted by the NOAA World Data Center for Paleoclimatology (<http://www.ncdc.noaa.gov/paleo/impd/paleofire.html> ). The IMPD archives both tree-ring (fire scars and the establishment dates of post-fire cohorts of trees) and charcoal proxy records of fire from around the world, although the collection is currently dominated by data from North America. All fire dates are contributed by research scientists in standard formats. Associated metadata are also available and user-friendly tools for accessing the data are being developed. There are currently 474 fire-scar chronologies archived with the IMPD, along with 51 studies from charcoal and other methods.

Supplemental Panel S-2. Additional considerations in inference from the tree-ring record.

In addition to variation in landscape burn patterns, variation among trees introduces other variables that can influence the formation of fire scars. Life history strategies and architecture of trees (e.g., high crowns and thick bark *vs*. low crowns and thin bark) interact with fire behavior to affect survivorship and scarring rates (Fall and Lertzman 1999). Mature individuals of thick-barked species (such as *Pinus ponderosa* or *Pseudotsuga menziesii*) may not sustain cambial damage in a very low-intensity fire, whereas younger individuals, or trees of thinner-barked species (such as *Pinus contorta*) may be killed outright. Surviving a fire is a size-dependent process: small trees are more likely to be killed outright than to survive with scars if the canopy base height is lower than flame or scorch height (Gutsell and Johnson 1996). These considerations influence the interpretation of fire severity and landscape patterns of fire occurrence.

Gradient studies also require careful interpretation if the recording species are not equally distributed over the geography of the gradient. For example, if scarred trees are found only in a certain elevation range in a study area, and within that only on some aspects, then estimates of fire interval and frequency may be influenced by these landscape differences in species distributions. Most fire history studies are designed to take this into account by limiting the scale of inference. Studies that combine fire-scars with other lines of evidence, such as tree death and post-fire recruitment dates, are especially valuable for providing convergent estimates of fire years and extent (Margolis et al. 2007, 2009; Brown et al. 2008).

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