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Reconstructing the Tropical Pacific ENSO Sea Surface Temperature Field

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Abstract Text:
We present two new climate field reconstructions (CFR) of tropical Pacific ENSO sea surface temperatures (SST) based on a targeted circum-Pacific tree-ring network from regions proven *a priori* to be sensitive to El Niño rainfall. The target field is based on 1x1° HadISST data for the boreal winter (December-February) season. The CFR methods used are Point-by-Point Regression (PPR) and reduced-space Orthogonal Spatial Regression (OSR). PPR and OSR take fundamentally different approaches to CFR, but each resulted in ENSO field reconstructions with high levels of validation skill as far back as 1100 CE over the Niño4, Niño3.4, Niño3 regions. However, the Niño1+2 region proved to be impossible to reconstruct with acceptable skill. This is reflected by the fact that only the leading EOF of the SST field (EOF1) could be reconstructed with a high level of skill using the OSR method. In contrast, EOF2 containing the Niño1+2 signal could not be reconstructed with any skill. PPR reconstructions over the same region, even though not based on EOFs, did not perform any better. This failure reflects the lack of tree-ring chronologies sensitive to ENSO forcing emanating from this small, highly coastal, upwelling region.

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