The Rice Lake Record

Vegetation and Climate

The abrupt expansion of southern oak woodland (Quercus) on the western Oregon coast occurred at ~ 8.8 ka in TN062-0550 as a peak in alder marks the cool, wet climate of the Younger Dryas. Off the coast (ODP 1019) beginning ~16 ka, increasing amounts of alder punctuated the Late glacial pine-dominated montane forests. Low SST and intensified (higher amplitude and more frequent) cycles of pine alternating with conifer forests by stepwise expansion of coastal redwood at ~11 ka and ~5.2 ka. Postglacial expansion of subarctic North Pacific Front and concomitant changes in regional SST cooling at ODP 1019. An expansion of alder and oak between ~4.0 and 3.0 ka during the early middle part of the Holocene (~9 to 7 ka) coincident with unstable conditions. A mosaic of mixed-evergreen forests and oak woodland at Pinus. Abrupt cooling of SSTs (~60 km offshore. The earliest portions of both the coastal and inland records (~7.7-7.9 13650±850). Cores from Rice Lake, ODP 1019, and TN062-0550 capture the development of North Coast Range vegetation that reflects changes in climate forcing throughout the Holocene and Younger Dryas.

Coastal Records

Marine core TN062-0550 and (ODP site 1019) lies in the upwelling zone on the continental shelf that borders the Oregon/California border. Marine algae, diatoms, and benthic foraminifera were studied in this core. The northward expansion of coastal redwood suggests increased upwelling associated with coastal upwelling. Before 11 ka, a peak is observed in oil redwood and a cool SST. Around 12 ka, an increase in oil redwood is accompanied by an increase in cool SST, which is associated with the early Holocene warming and accelerated ENSO development. Re-expansion of oil redwood at ~5 ka is interpreted as a brief warming event, followed by increased chaparral, is observed elsewhere in the Eel River valley. Expansion of southern oak woodlands on the Franciscan melange, which has low available water holding capacity, implies early Holocene warming, as well as tectonism, fire, and bedrock.

Comparison with TN062-0550

Cores from Rice Lake, ODP 1019, and TN062-0550 capture the development of North Coast Range vegetation that reflects changes in climate forcing throughout the Holocene and Younger Dryas. The Rice Lake pollen record is a 2-3 fold increase in pollen concentration. However, chronology in the younger part of the core records may not be accurate.

CONCLUSIONS

Comparison with TN062-0550

Climatic and environmental variability in the North American monsoon system is strongly correlated with interhemispheric teleconnection patterns. A new regional record of the North American monsoon is obtained from an ice core in the Sonoran Desert. The record is composed of annual layers of sediment and contains a multiproxy proxy record of climate variability. The record is correlated with other proxy records from the North American monsoon system and is compared with global climate records from other regions. The results provide a new perspective on the dynamics of the North American monsoon and its role in the global climate system.

REFERENCES
