Earlywood, Latewood, & The Summer Monsoon
Earlywood & Latewood

**Earlywood**
- Lighter color
- Less Dense
  (Larger cells/thinner walls)
- Conducts water & nutrients

**Latewood**
- Darker color
- More Dense
  (Smaller cells/thicker walls)
- Provides structural stability
Earlywood & Latewood

1874
1873
1872
1871

EW
Dry Winter
LW
Dry Summer
EW
Dry Winter
LW
Wet Summer
EW
Dry Winter
LW
Wet Summer

Correlation

Chronology Type
TW EW LW LWa

p<0.05

0 0.2 0.4 0.6 0.8
-0.2

Oct-Apr
Jul-Aug

The University of Arizona
Laboratory of Tree-Ring Research
University of Arizona
CLIMAS
Climate Assessment for the Southwest
NSF
EPA
A New Tree-Ring Network of Earlywood and Latewood Chronologies
Field Work

- 53 Sites
- 20 trees per site
- 2 cores per tree
Lab Work

• Re-measure each sample for earlywood and latewood widths
• Prepare, date, measure new samples
• Compute chronologies
Tree Rings and the North American Monsoon

Project Goals

• Develop the first monsoon-sensitive chronology network in the SW U.S.
• Investigate long term monsoon season drought variability in SW U.S.
• Compare cool-season and monsoon-season precipitation in the paleo records
• Assess relationship between monsoon and large scale circulation (i.e., El Niño)
• Provide useful information to stakeholders

http://monsoon.ltrr.arizona.edu
Precipitation, Tree Growth, Standardized Precipitation

![Graphs showing precipitation and earlywood width data.](image-url)
Precipitation, Tree Growth, Standardized Precipitation

- **Precipitation (inches)**
  - Count
  - Values: 0, 2, 4, 6, 8, 10, 12, 14

- **Standardized Precipitation Index**
  - Count
  - Values: -2, -1, 0, 1, 2
  - Arrows indicate specific precipitation levels: 1", 3", 6", 9", 12", 15"
Summer and Winter Precipitation Reconstructions

- **Douglas-fir**
- **Ponderosa pine**
- **Other pines, fir**

Reconstruction Target Area

- Las Vegas
- Durango
- Albuquerque
- El Paso
- United States
- Mexico
- Phoenix
- Tucson
Reconstruction Predictors

June-August SPI

- 15 Chronologies
- 662 Trees

October-April SPI

- 37 Chronologies
- 1,605 Trees
NAME Region 2 SPI Reconstructions

63% Variance Explained

53% Variance Explained

71% Variance Explained
NAME Region 2 SPI Reconstructions: 1539-2008