Western Region Technical Attachment
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METEOROLOGY IN THE NEWS

[Editor's Note: This week we are featuring synopses of three weather-related articles which have appeared recently in Science News, a weekly science news magazine.]

La Nina - Southwest U.S. Forest Fire Link - Researchers at the University of Arizona and the U.S. Geological Survey have found a strong correlation between La Nina and wildfire activity in the Southwest. La Nina occurs when waters in the central Pacific turn unusually cold, in contrast to El Nino when these waters are abnormally warm.

The scientists compared fire statistics, dating back to 1905, with the fluctuations of the Southern Oscillation Index which can serve as an indicator of El Nino or La Nina conditions. Additionally, they compared fire scars from trees in the Southwest with historical rainfall data from Peru to compile a database back to around 1700. Heavy rains accompany El Nino conditions in Peru.

During El Nino years, the Southwest usually experiences wet springs and falls, inhibiting wildfire activity. In contrast, during La Nina years, severe winter-spring droughts often grip the Southwest, followed by high wildfire activity.

Although the La Nina - wildfire correspondence is not perfect, the correlation is sufficiently strong such that land management officials now have a good indicator to make advanced decisions regarding prescribed burns, allocation of resources, and the organization of fire fighting efforts. [*Science News*, September 1, 1990, Vol. 138 no. 9 p 132]

Near Record Ozone Hole in the Antarctic - On October 4 of this year, satellite measurements of the ozone layer over Antarctica yielded a value of 125 Dobson units which compares to the record values of 121 and 125 Dobson units registered in 1987 and 1989, respectively. Every year since 1977, the ozone layer over the Antarctic region has thinned dramatically (more so in recent years) during September, the onset of springtime.

The ozone hole, as it's more commonly called, forms because extremely cold stratospheric temperatures, during this time of the year, activate chlorine and bromine pollutants that chemically attack ozone. After a month or two, stratospheric winds normally change, advecting in ozone-rich air and closing the "hole". These same pollutants are apparently reducing ozone around the globe, but at a slower rate.

The 1990 near-record value was not unforeseen. NOAA scientist James K. Angell has found a statistical link between ozone loss in the Antarctic and two variables: sea surface temperatures near the equator and the Quasi-Biennial Oscillation (QBO). The QBO refers to the stratospheric winds that circle the equator and reverse about every thirteen months. Stratospheric temperature records over Singapore were used to determine the direction and strength of the QBO.

Angell found that when both equatorial stratospheric and sea surface temperatures increased from one summer to the next, ozone depletions over the Antarctic would be worse than the year before during October and November. As of this date, there is the physical link between these equatorial conditions and the ozone hole. [*Science News*, October 13, 1990, Vol. 138, No.15, p 228]

Aerosols - Influence on Climatic Change? - As the debate on greenhouse warming and global climate change continues, two NASA scientists speculate that aerosols may play a mitigating role in this scenario.

Aerosols are tiny liquid or solid particles that enter the atmosphere from both natural and anthropogenic sources, with the highest concentrations over the industrialized nations where coal burning is a significant source. Aerosols directly cool the earth by reflecting sunlight back to space, and indirectly by serving as a catalyst for cloud droplet formation (albedo).

The scientists stated that the role of aerosols in global warming could be minor or major, depending on their concentrations and impact on clouds. To some extent, the aerosols could partially cancel the greenhouse effect. The role of aerosols, particularly with respect to cloud formation (because of the significance of cloud interactions in current climate models) casts more uncertainty into the questions surrounding global warming. [*Science News*, August 25, 1990, Vol 138, No. 8, p 118]