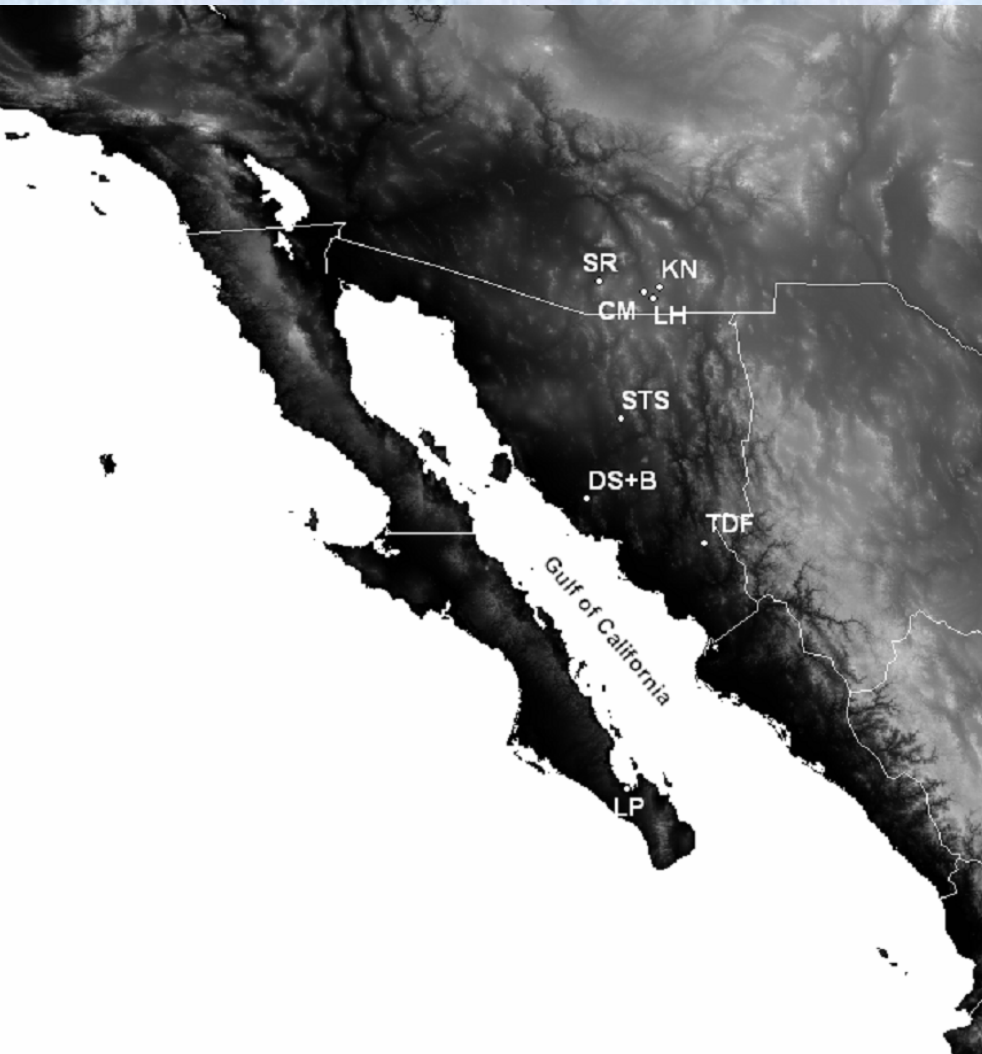
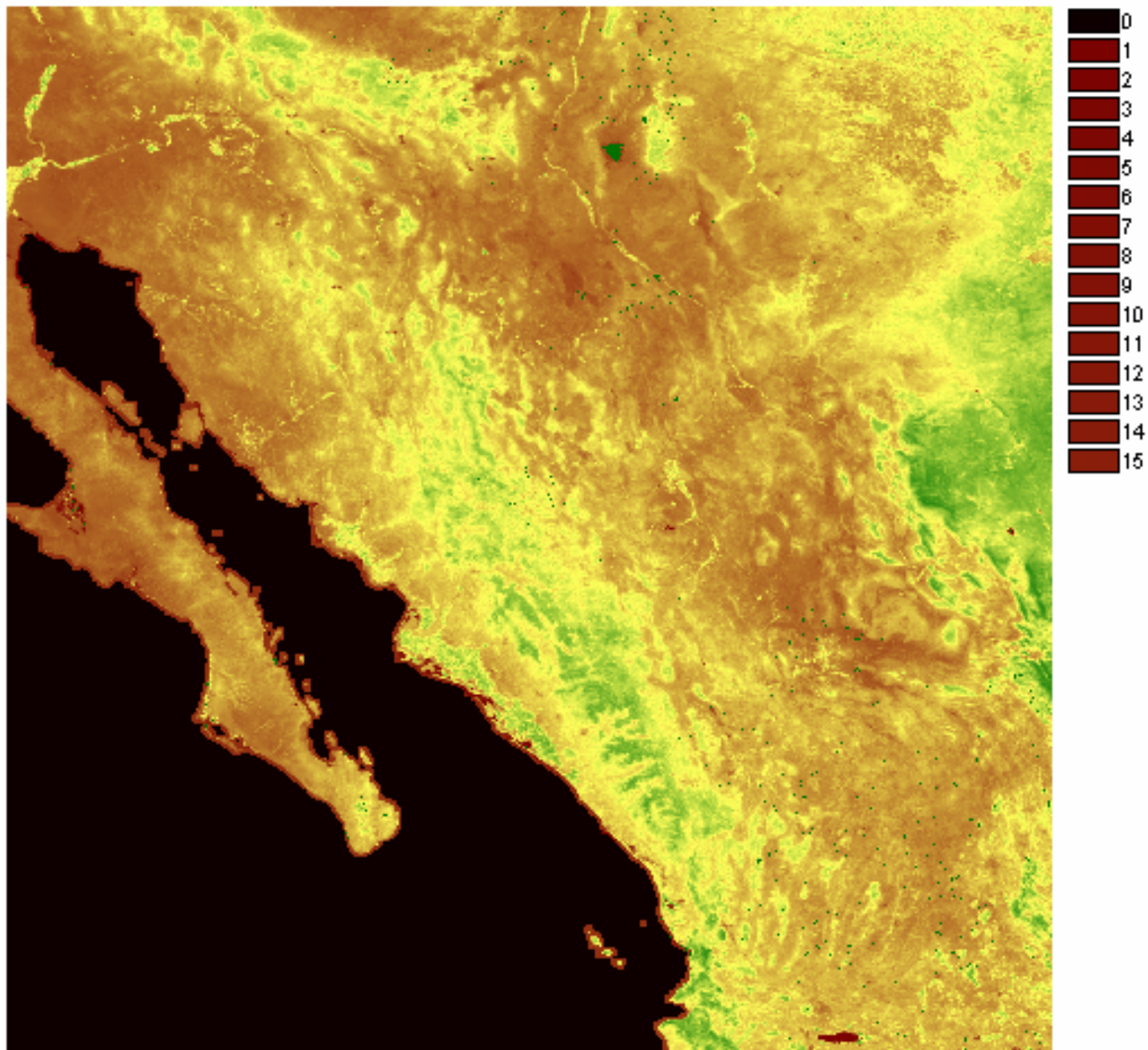


DROUGHT IN NORTHWEST MEXICO

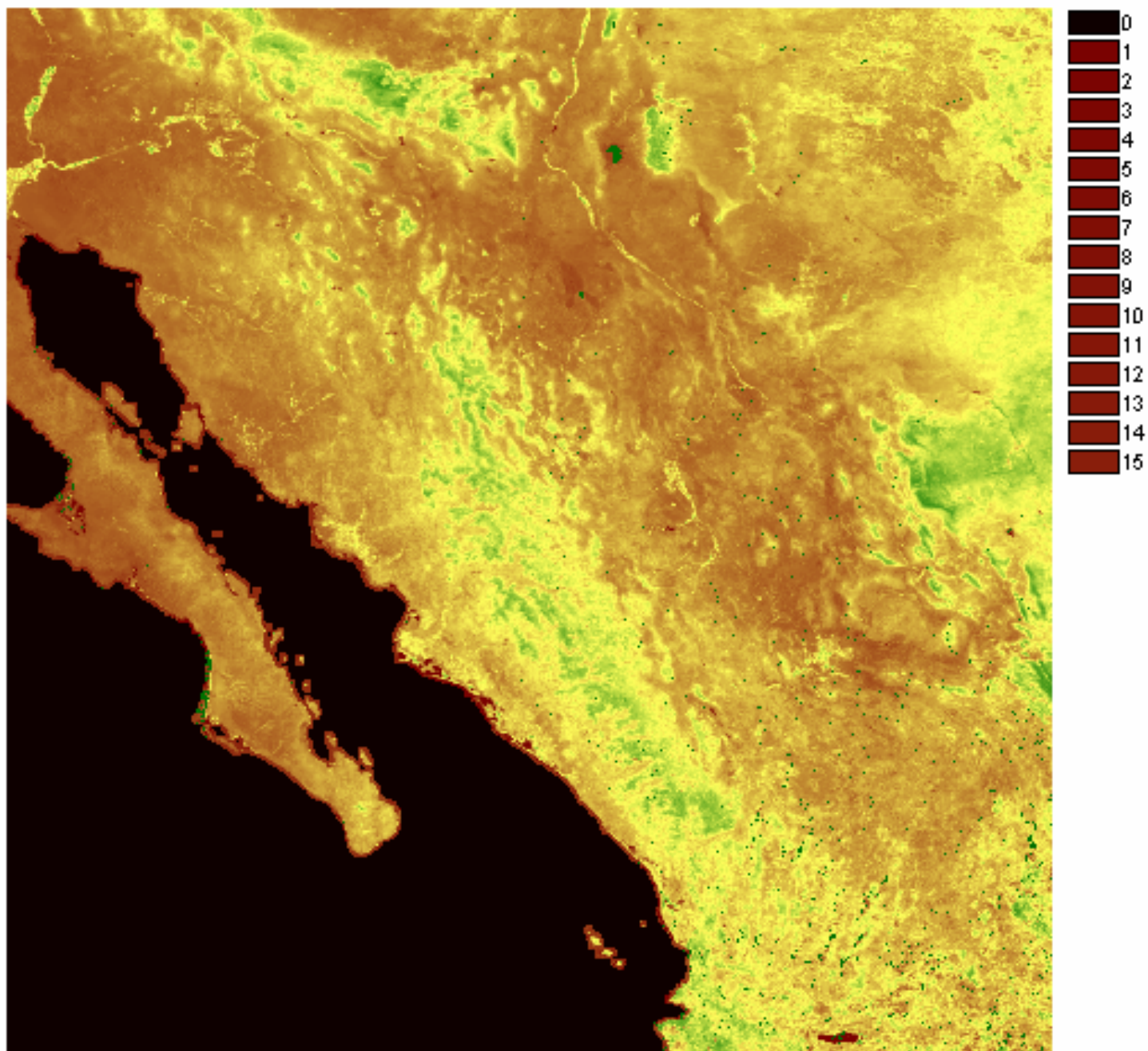


Christopher Watts
Jesus Francisco Sabori
Universidad de Sonora

May1 04



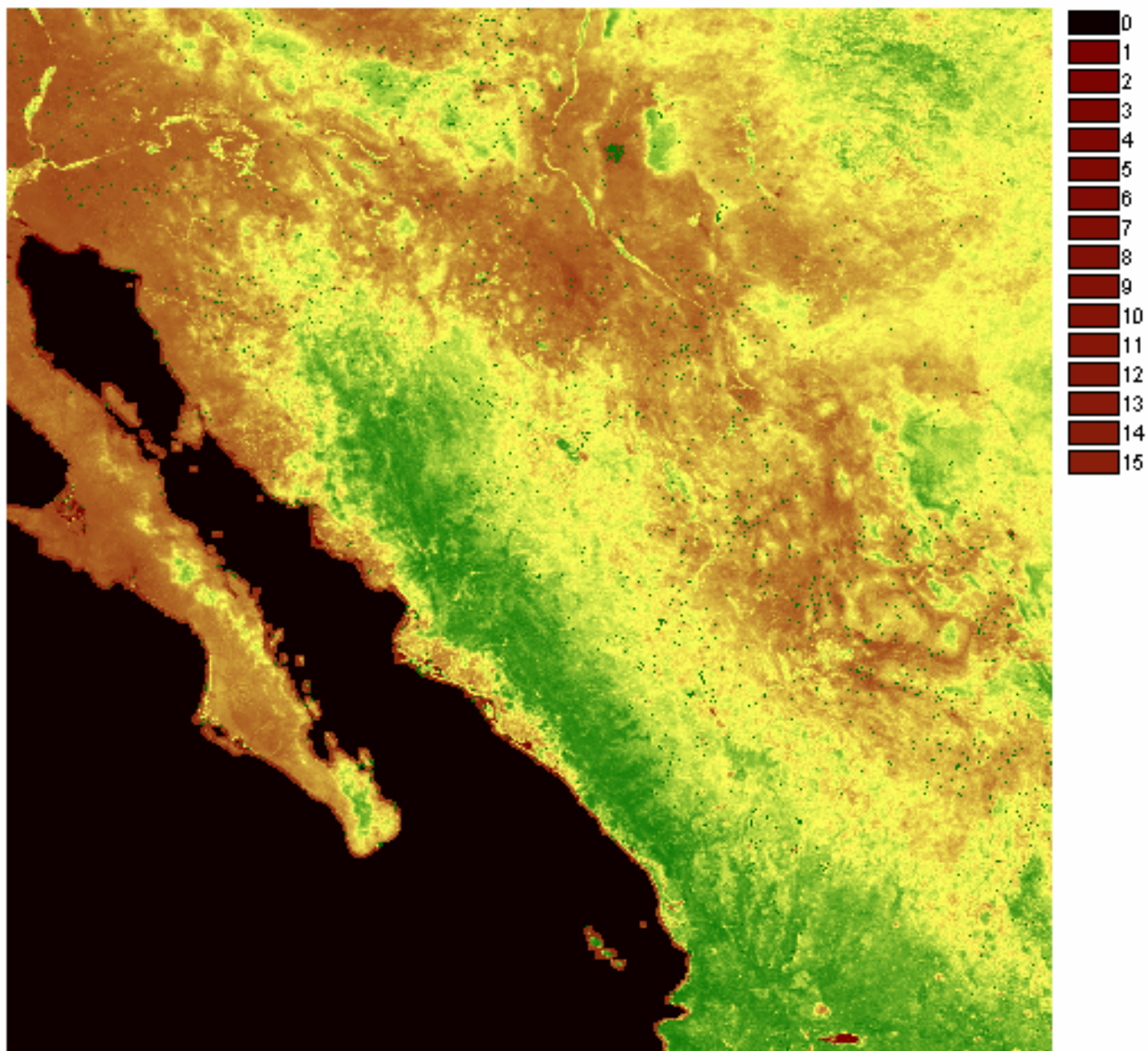
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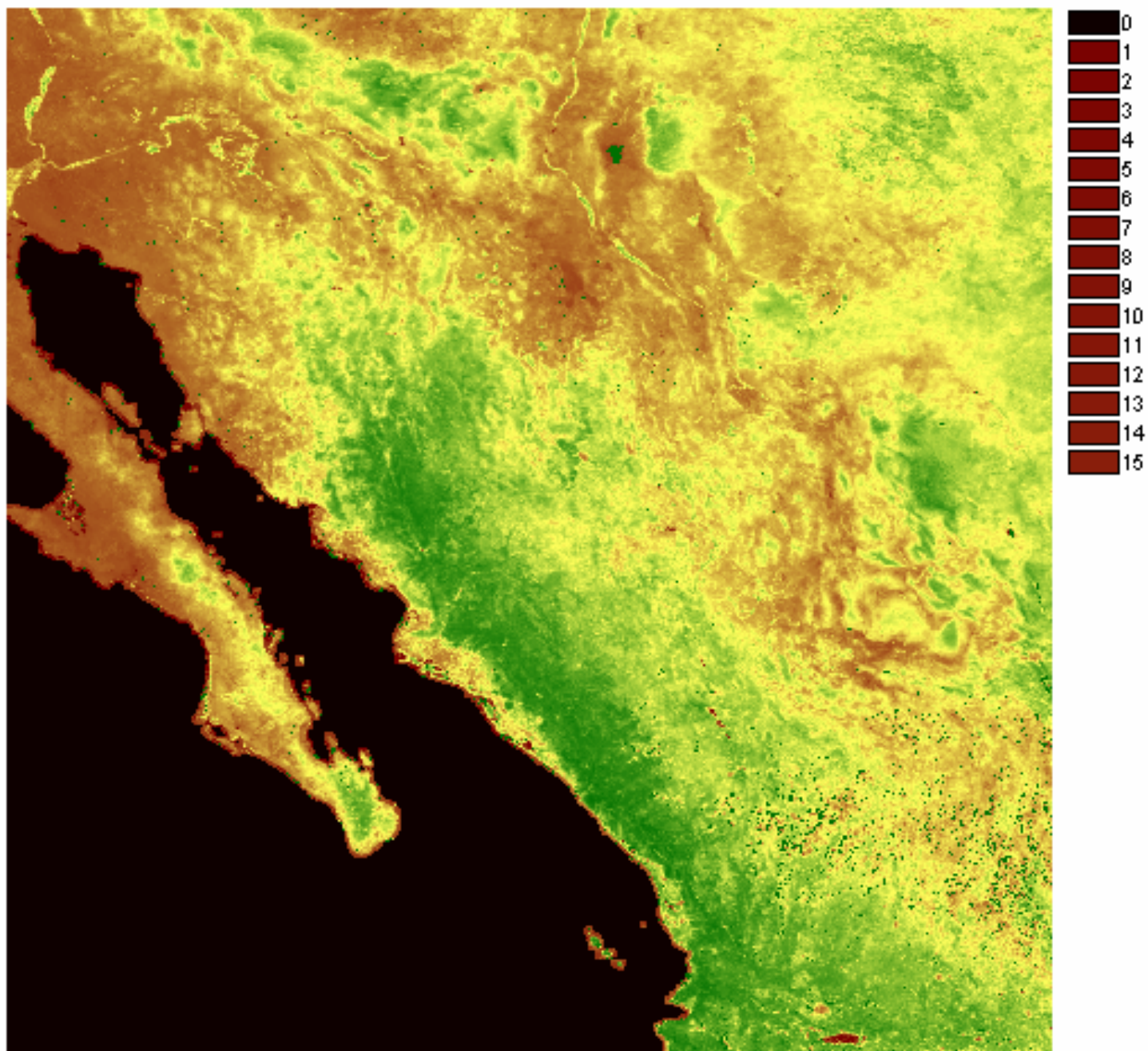
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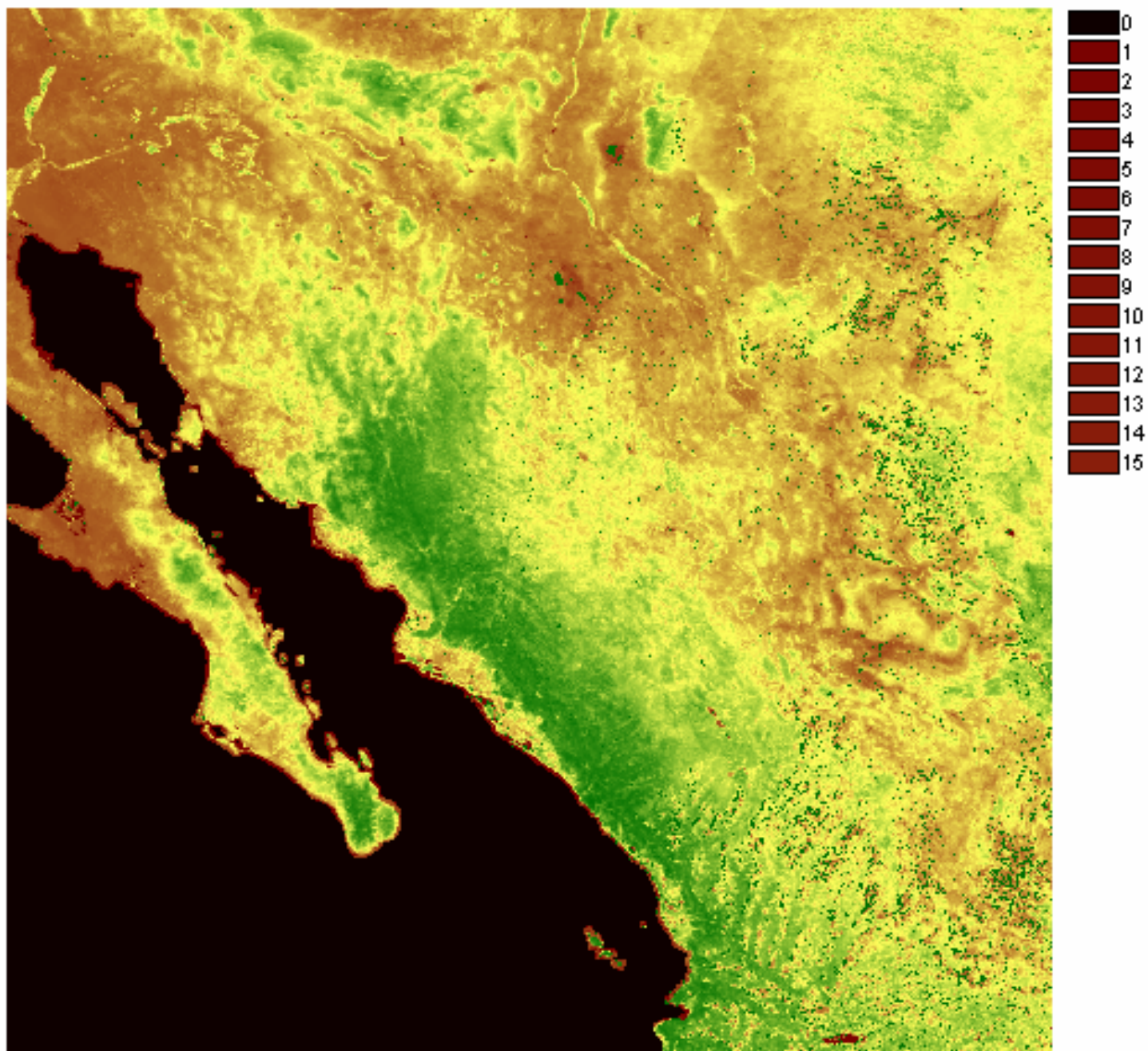
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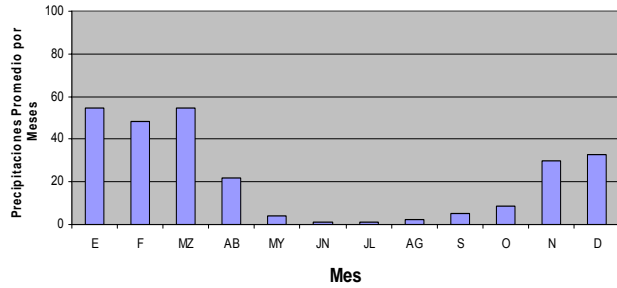
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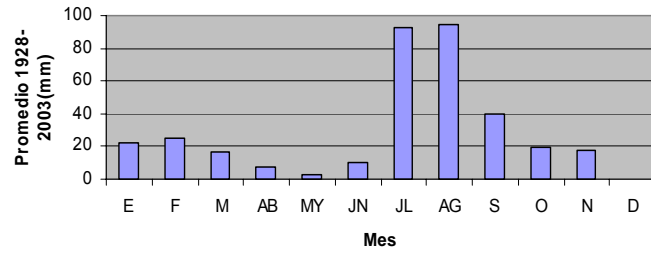
Sep3 04



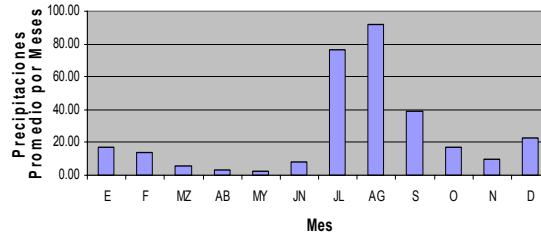
**Precipitaciones Promedio por Meses
Ensenada, B.C.**



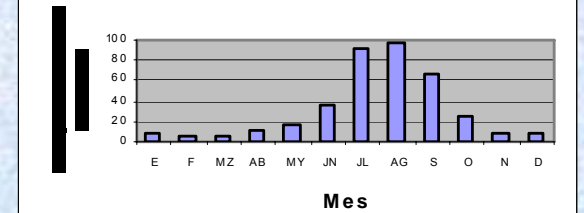
**Precipitación Promedio por Mes
Presa Cuauhtemoc, Son.**



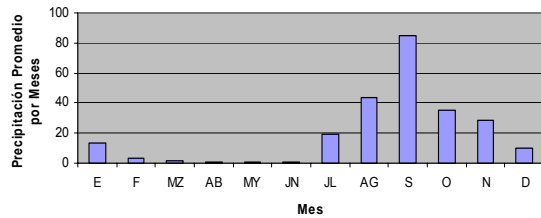
**Precipitaciones Promedio por Mes
Hermosillo, Son.**



**Precipitación Promedio por Mes
Chihuahua, Chih.**



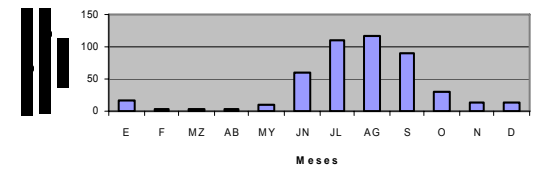
**Precipitación Promedio por Mes
San José del Cabo, B.C.S.**



**Precipitación Promedio por Mes
Mazatlán, Sin.**



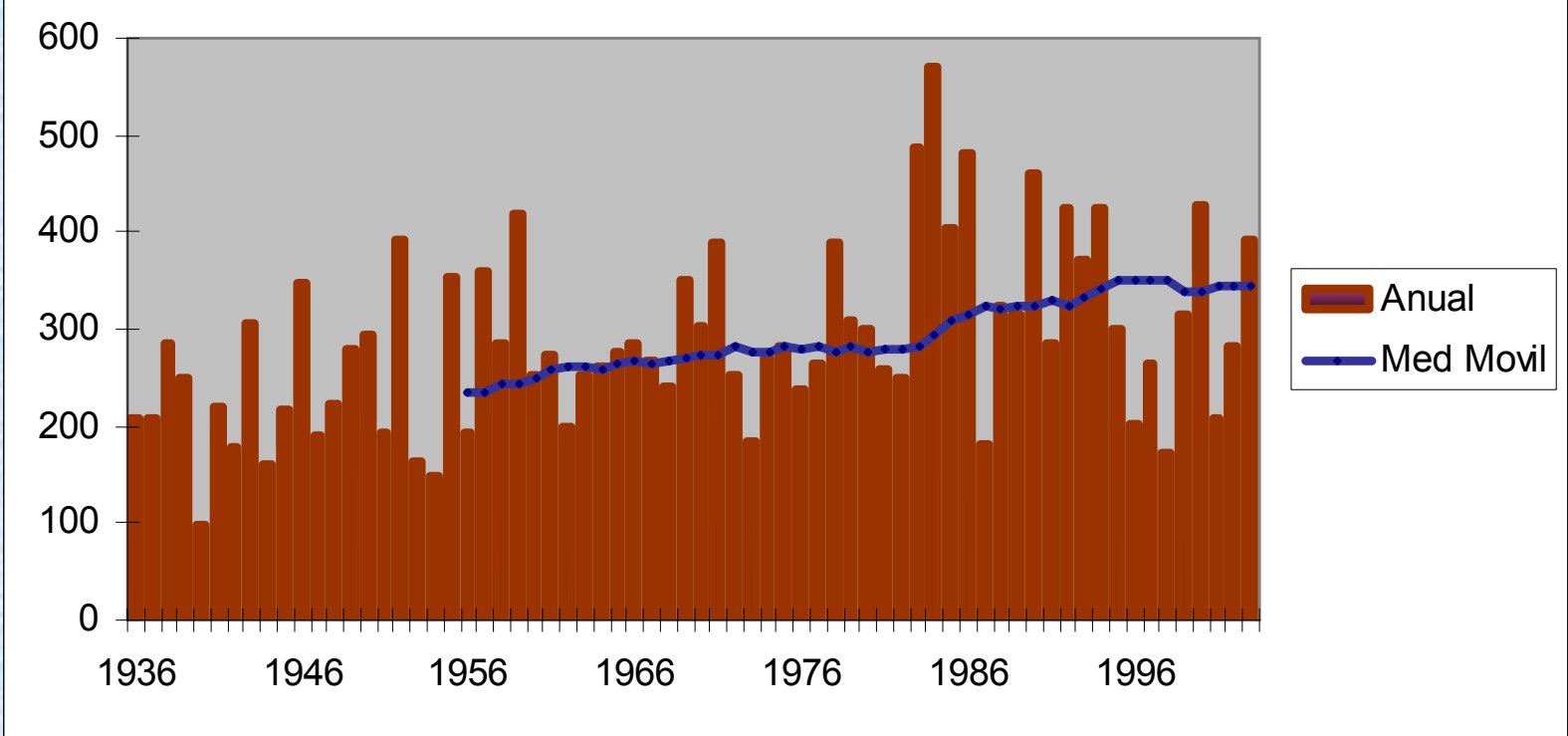
**Precipitación Promedio por Mes
Durango, Dgo.**



Meteorologic Drought

... a **prolonged** period when the rainfall is **significantly** below **normal**

Precipitación Anual en Hermosillo



Mean = 288 mm in 69 years from 1936 to 2004

10-year Means

213

258

277

282

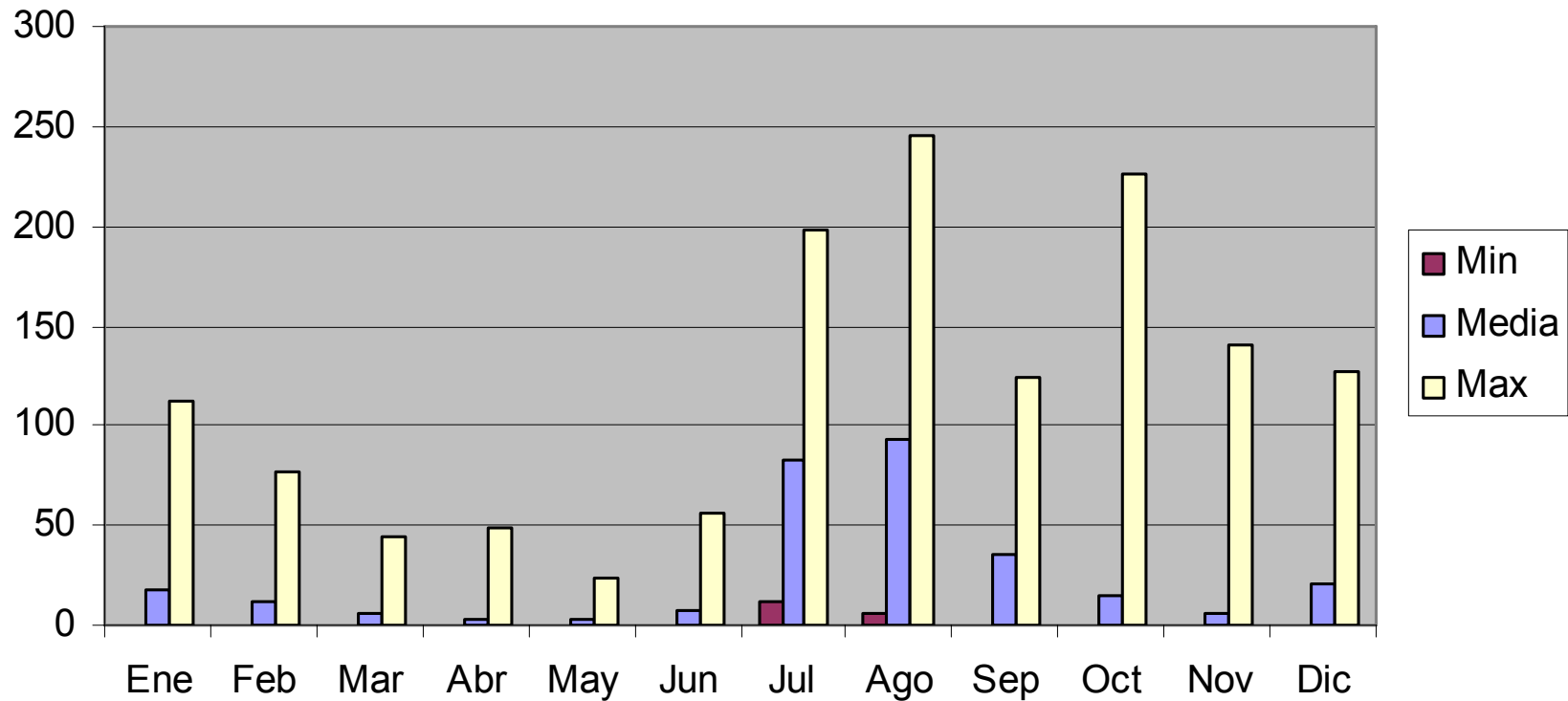
347

356

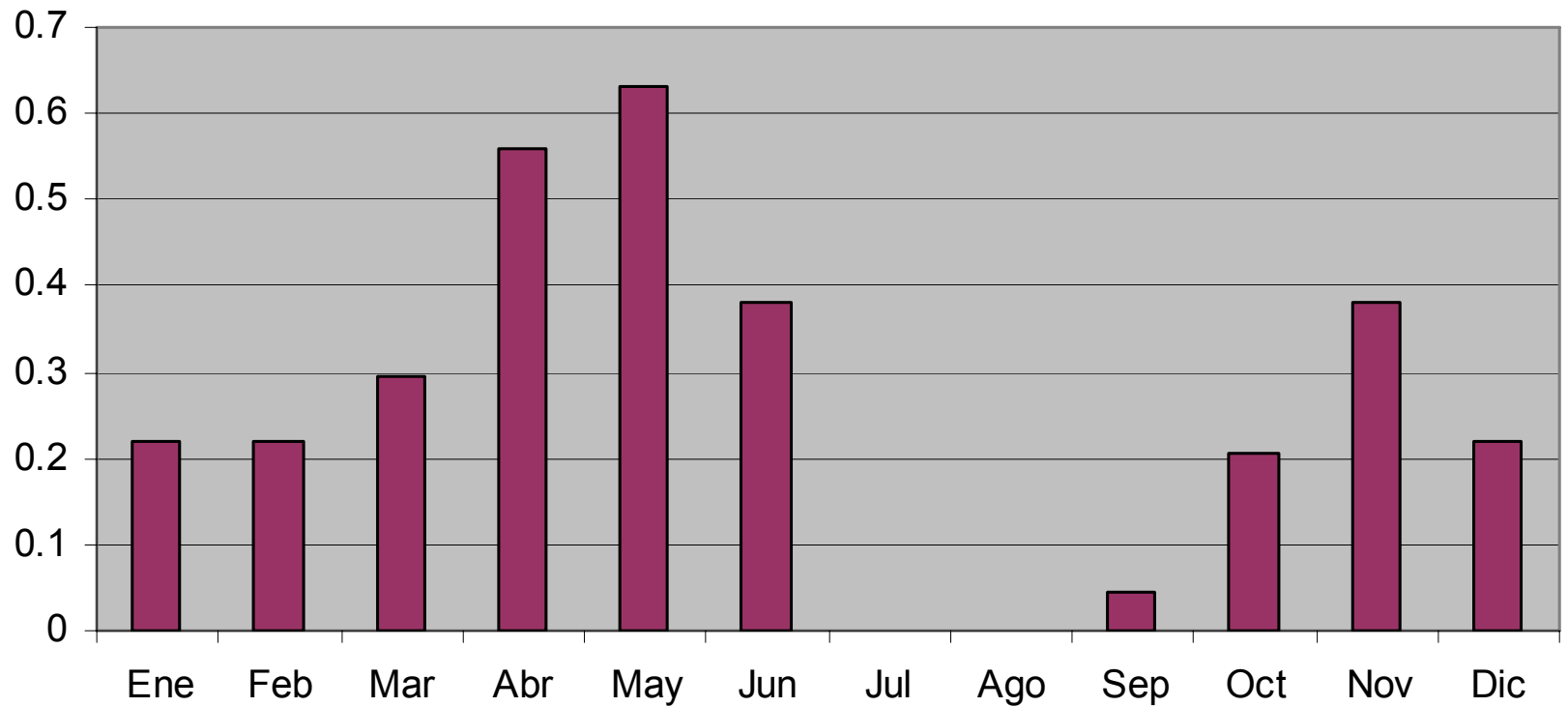
283

Distribucion Estacional de la Lluvia

Precipitación Mensual en Hermosillo

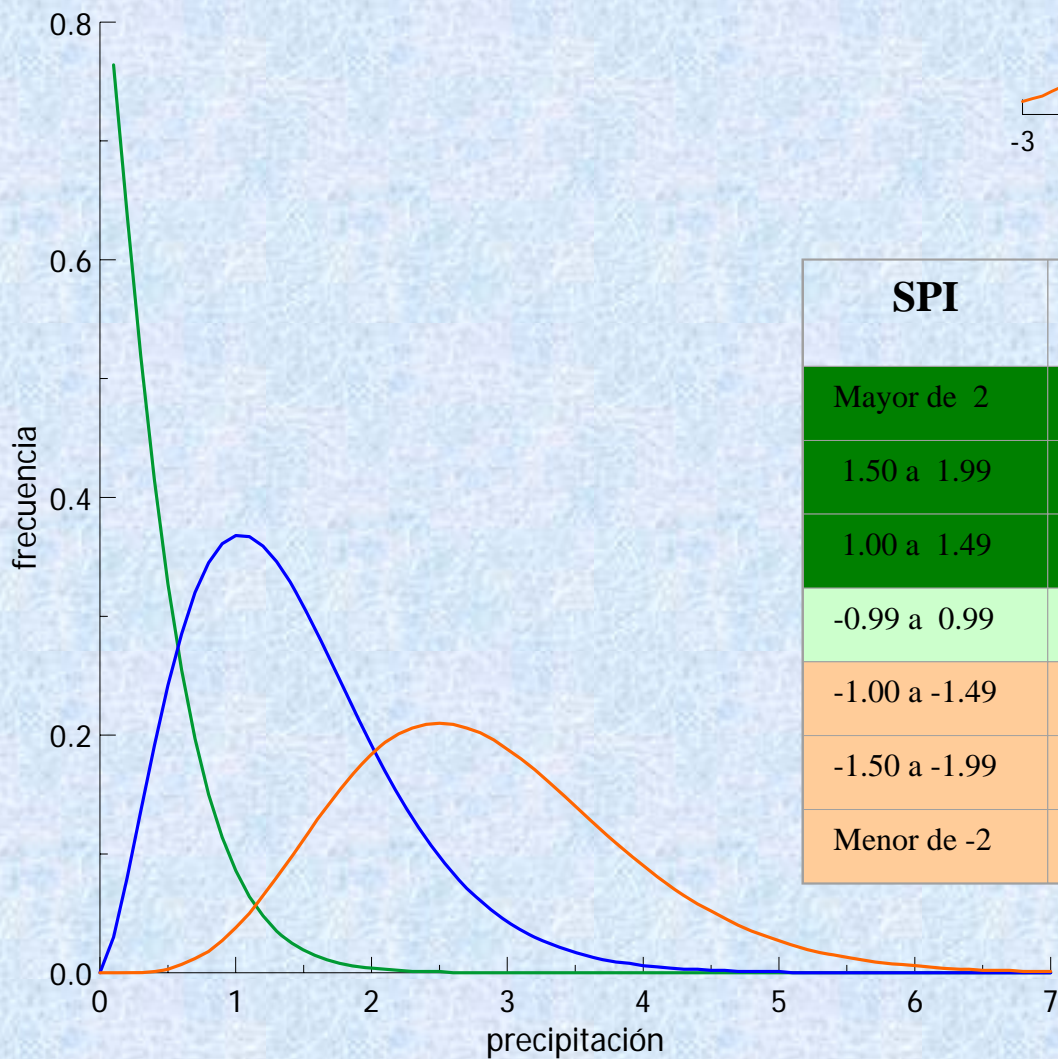
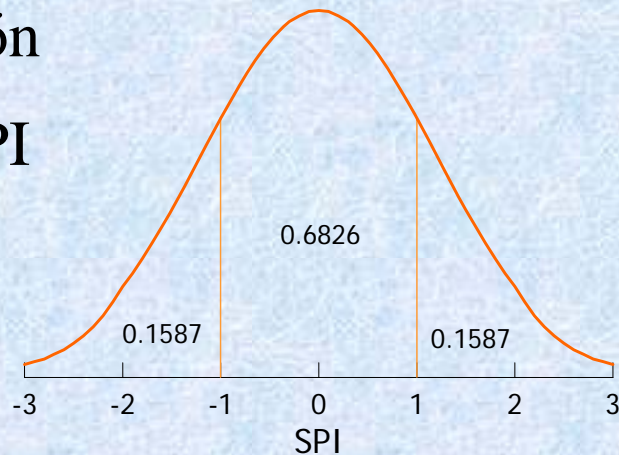


Fracción de meses sin lluvia en el registro



Indice Estanderizado de Precipitación

Standardized Precipitation Index SPI



SPI	Probabilidad Acumulada	Estado
Mayor de 2	0.0228	Extremadamente húmedo
1.50 a 1.99	0.0668	Muy húmedo
1.00 a 1.49	0.1587	Moderadamente húmedo
-0.99 a 0.99	0.5000	Cercano a lo normal
-1.00 a -1.49	0.8413	Moderadamente seco
-1.50 a -1.99	0.9332	Severamente seco
Menor de -2	0.9772	Extremadamente seco

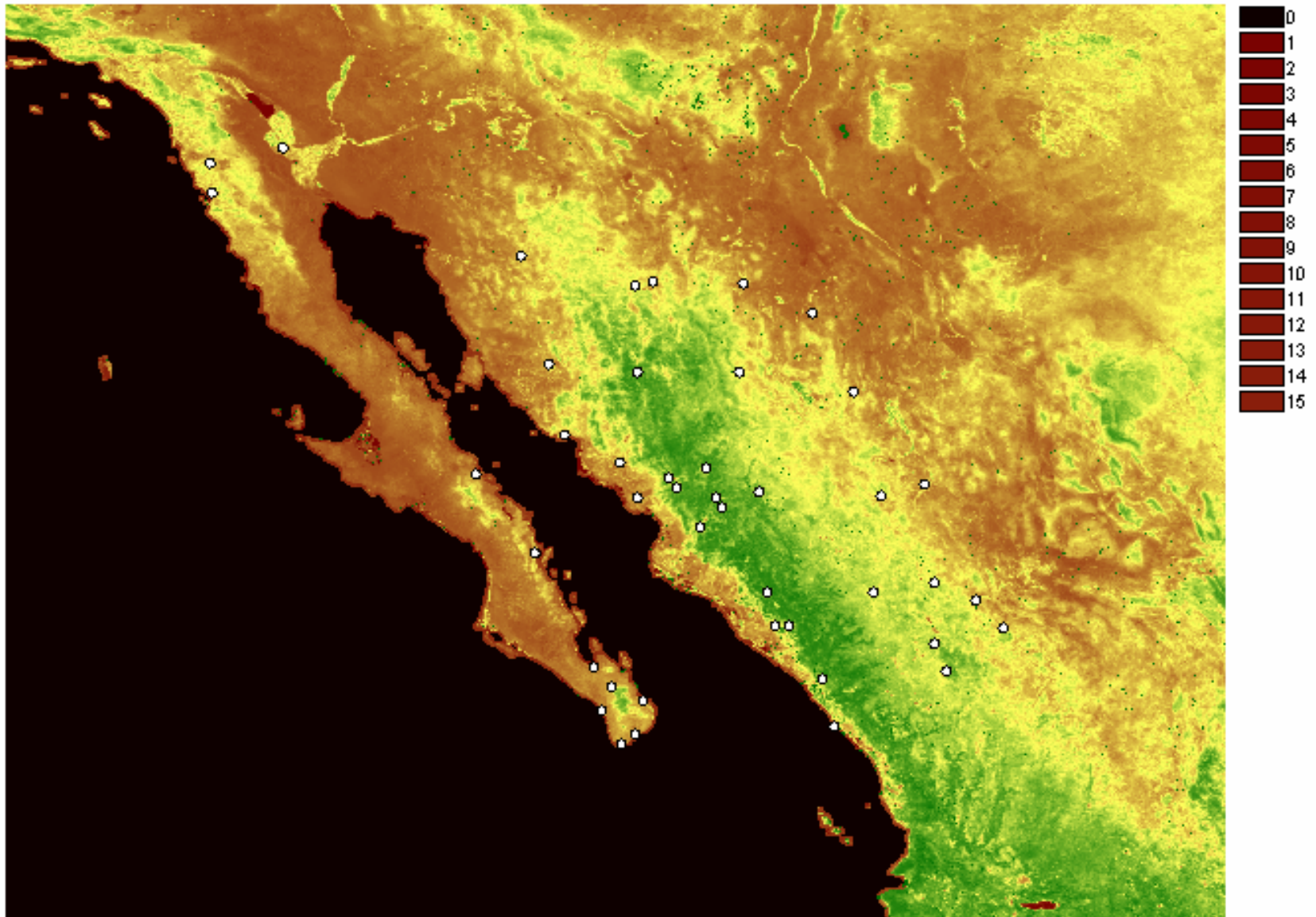
Definición de Sequía *Atípica* FONDEN (2004)

Período Temporada de Lluvias
Verano, Invierno, Todo el año

Criterio Que la lluvia total durante el período esté por debajo del decil 0.1. La probabilidad de la sequía atípica es del 10%
($SPI < -1.28$)

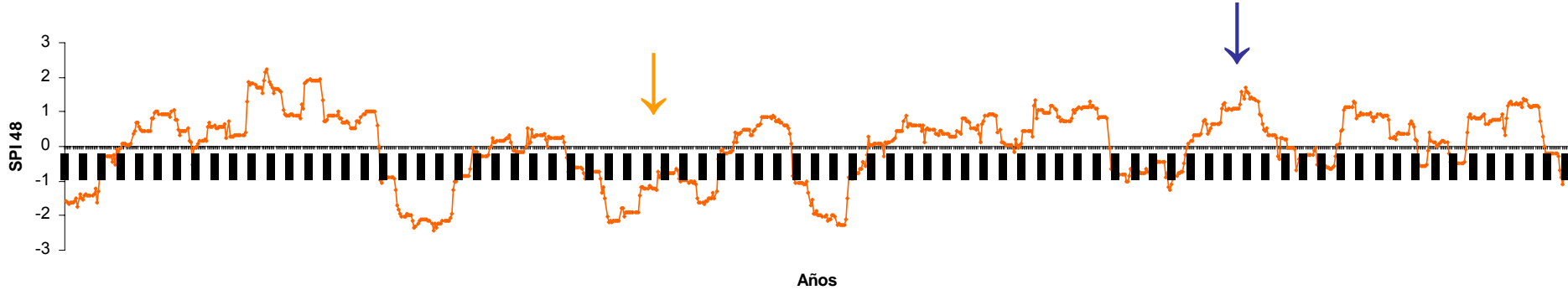
McKee (1993): Una secuencia de períodos consecutivos con SPI negativo, incluyendo al menos uno con $SPI < -1$

Map of Climatological Stations

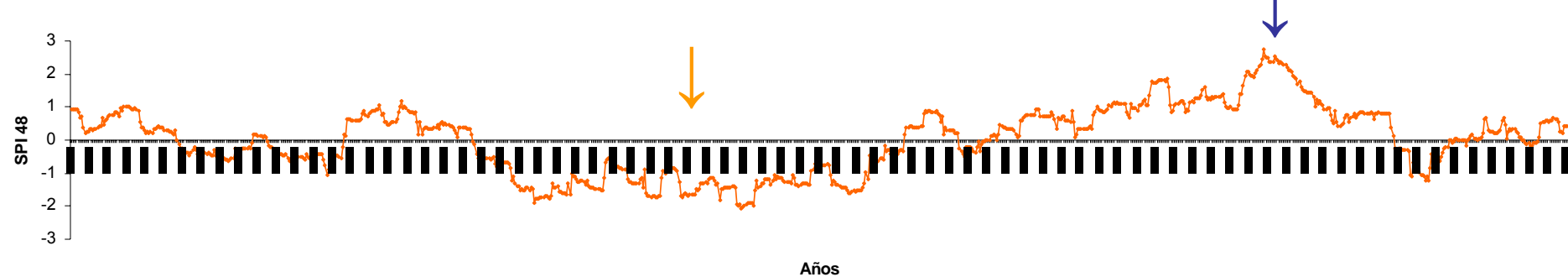


Stations with data from the 1920s

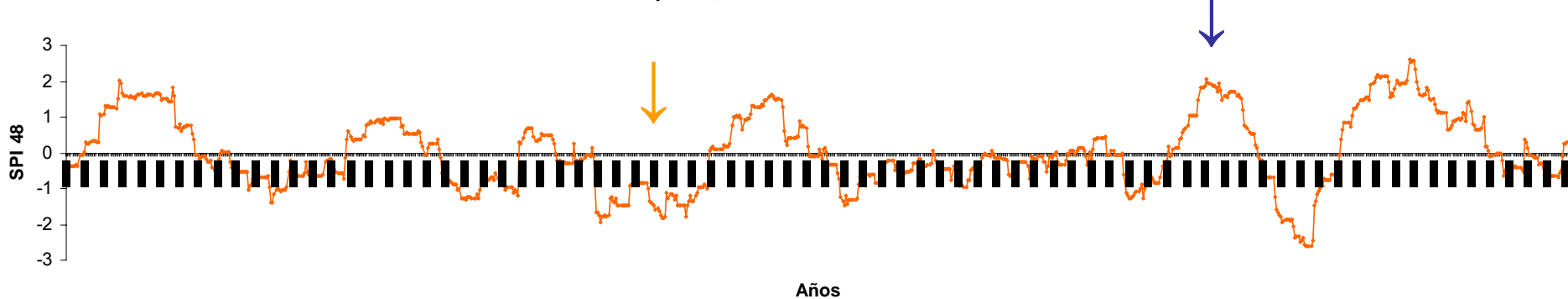
Mazatlán, Sinaloa. SPI 48. 1920-2003.



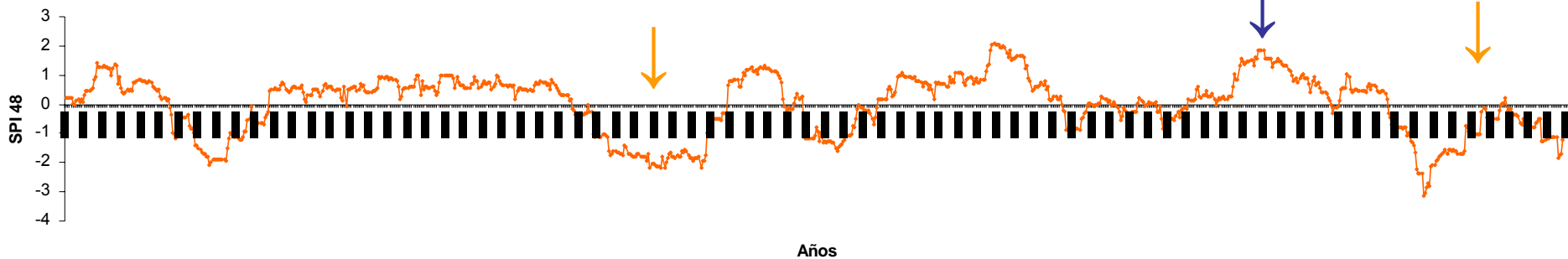
Chihuahua, Chihuahua. SPI 48. 1920-2003



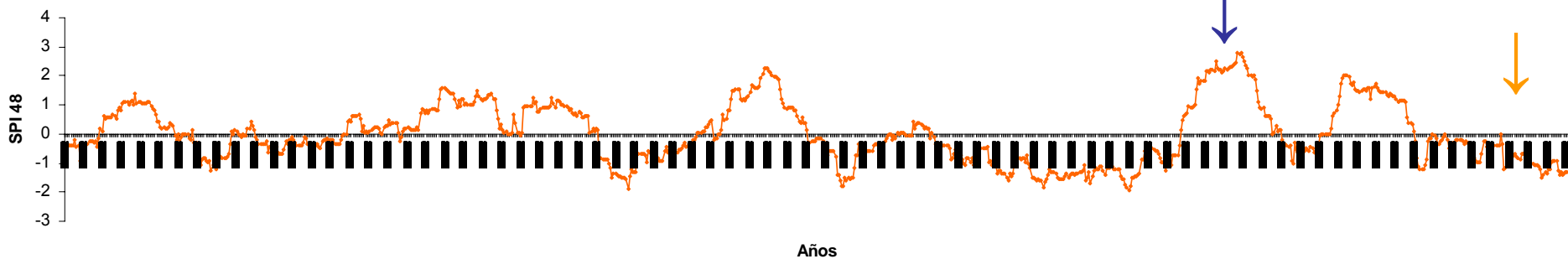
Empalme, Son. SPI 48. 1921-2003



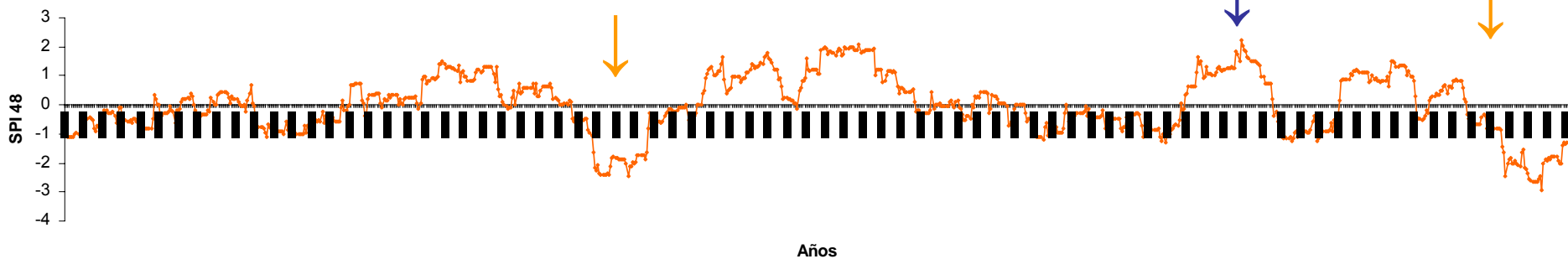
Torreón, Coahuila. SPI 48. 1921-2003



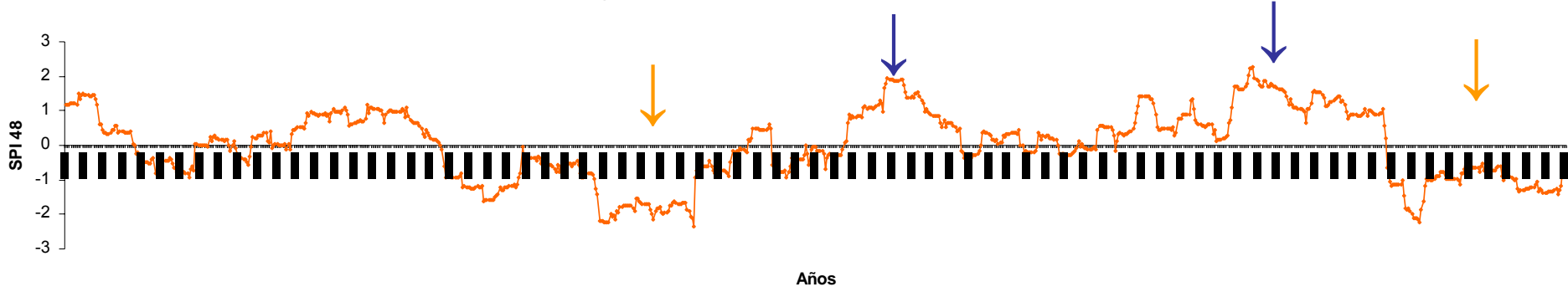
Choix, Sinaloa. SPI 48. 1921-2003



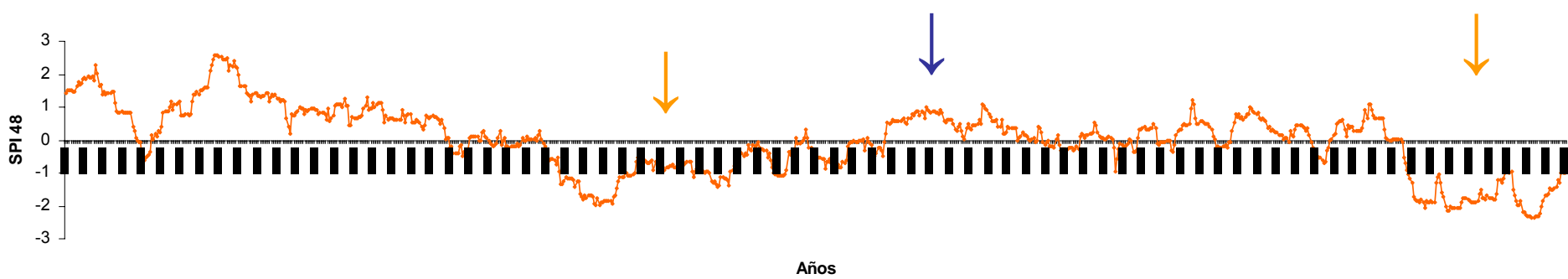
Culiacán, Sinaloa. SPI 48. 1921-2003



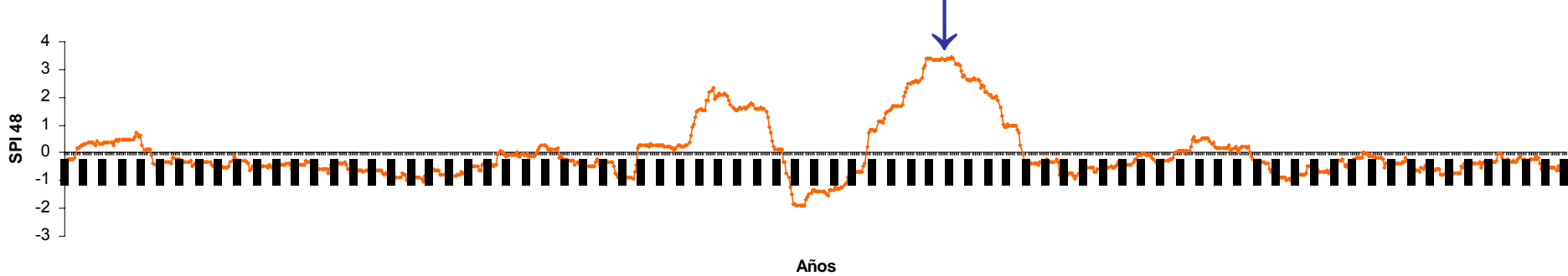
Hidalgo del Parral, Chihuahua. SPI 48. 1922-2003



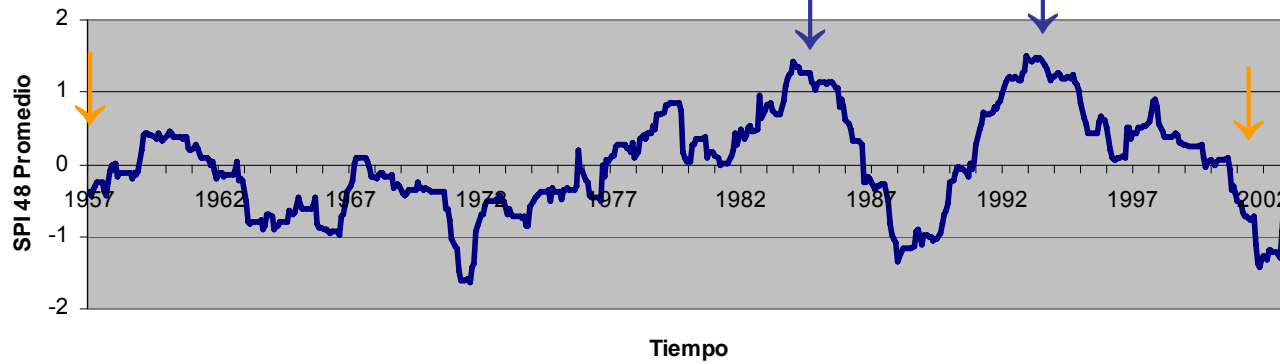
Tepehuanes, Durango. SPI 48. 1922-2003



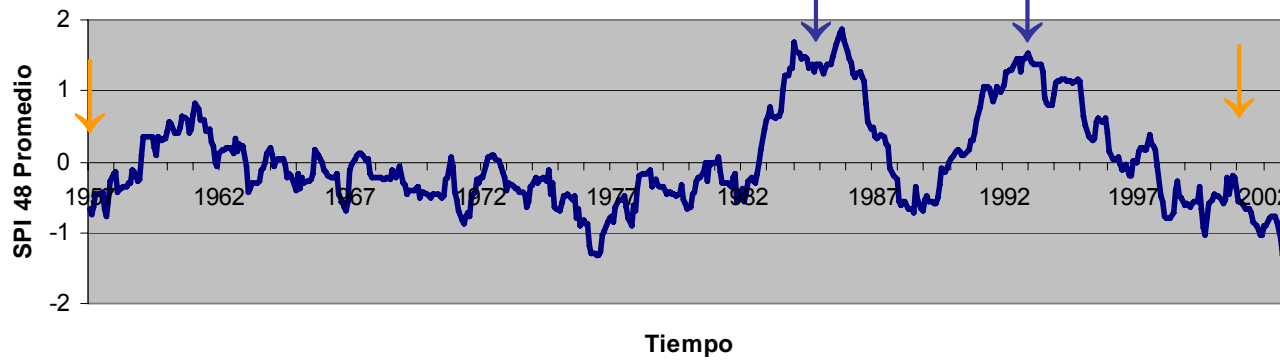
Tepic, Nayarit. SPI 48. 1922-2003



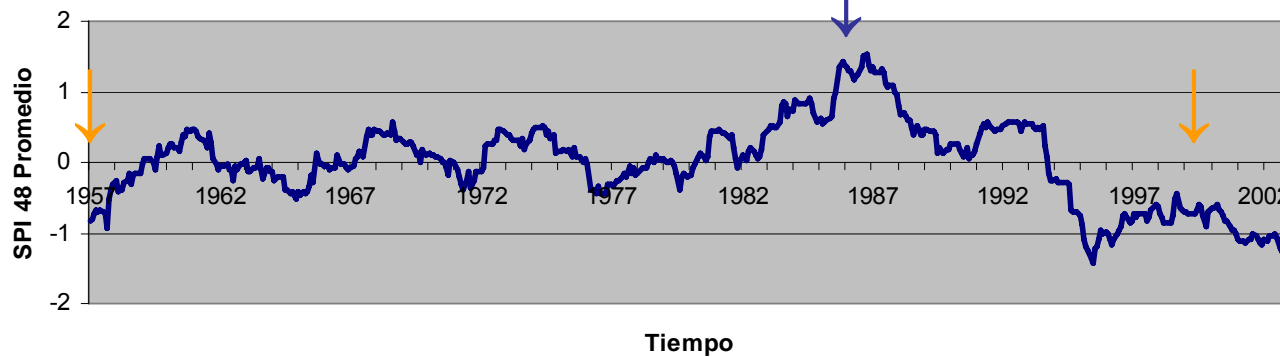
SPI 48 Promedio de 8 Estaciones. Baja California. 1957-2003



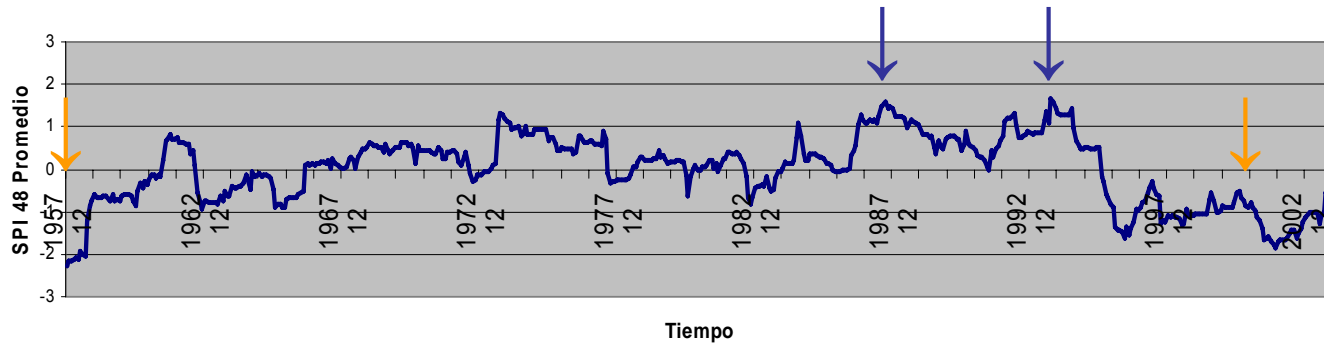
SPI 48 Promedio de 9 Estaciones. Sonora. 1957-2003



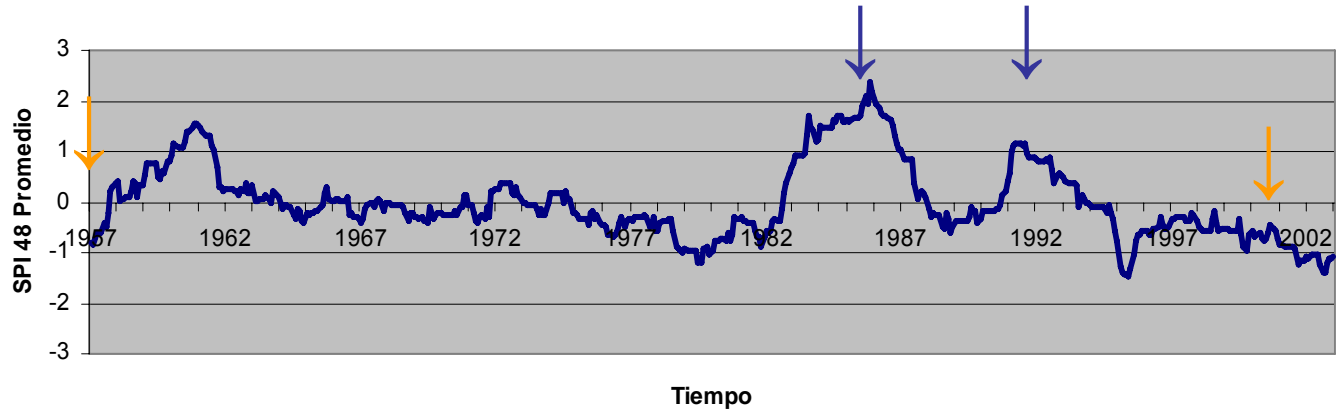
SPI 48 Promedio de 7 Estaciones. Chihuahua. 1957-2003



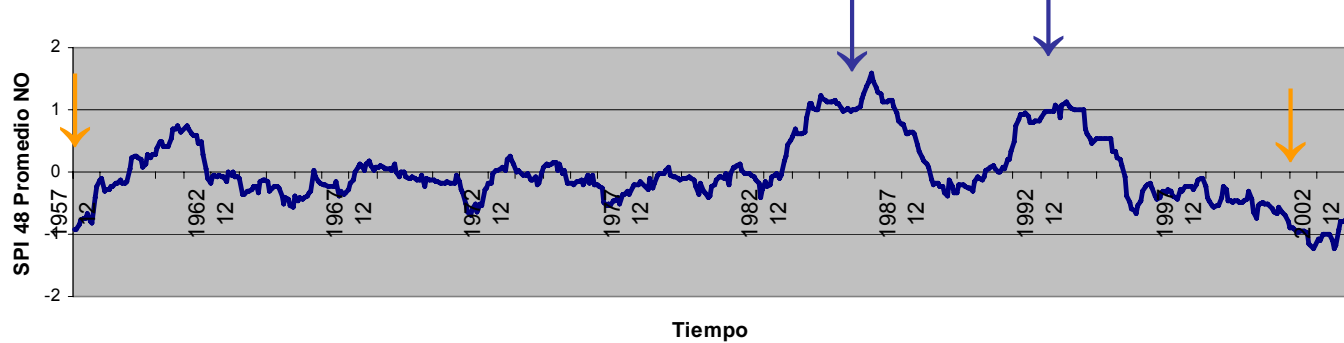
SPI 48 Promedio con 6 Estaciones. Durango.1954-2003



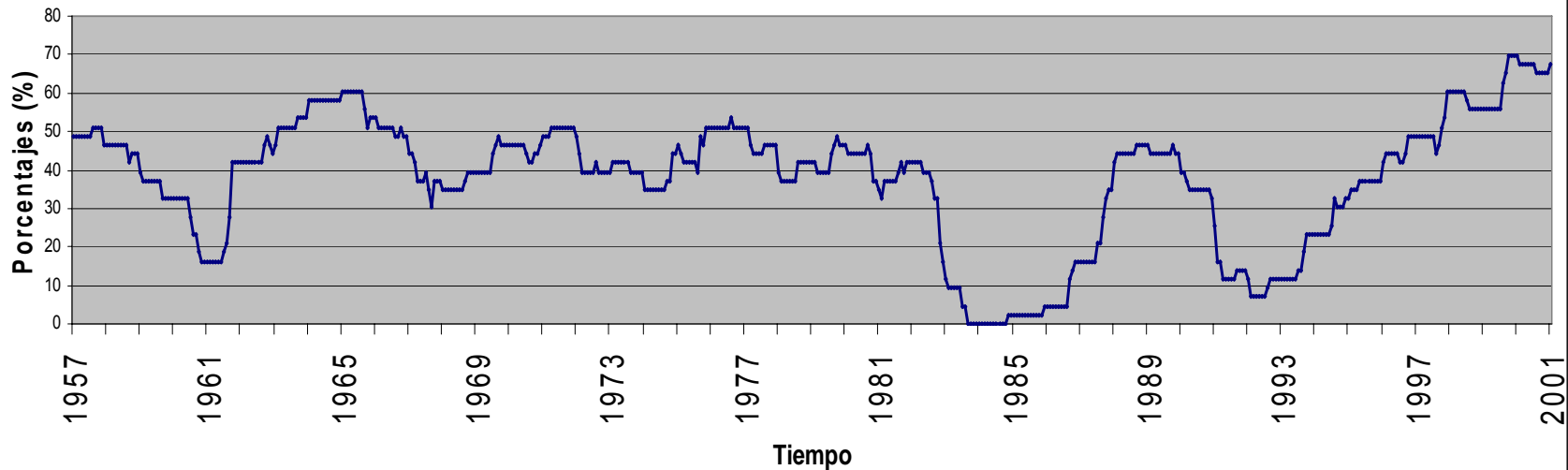
SPI 48 Promedio de 8 Estaciones. Sinaloa. 1957-2003



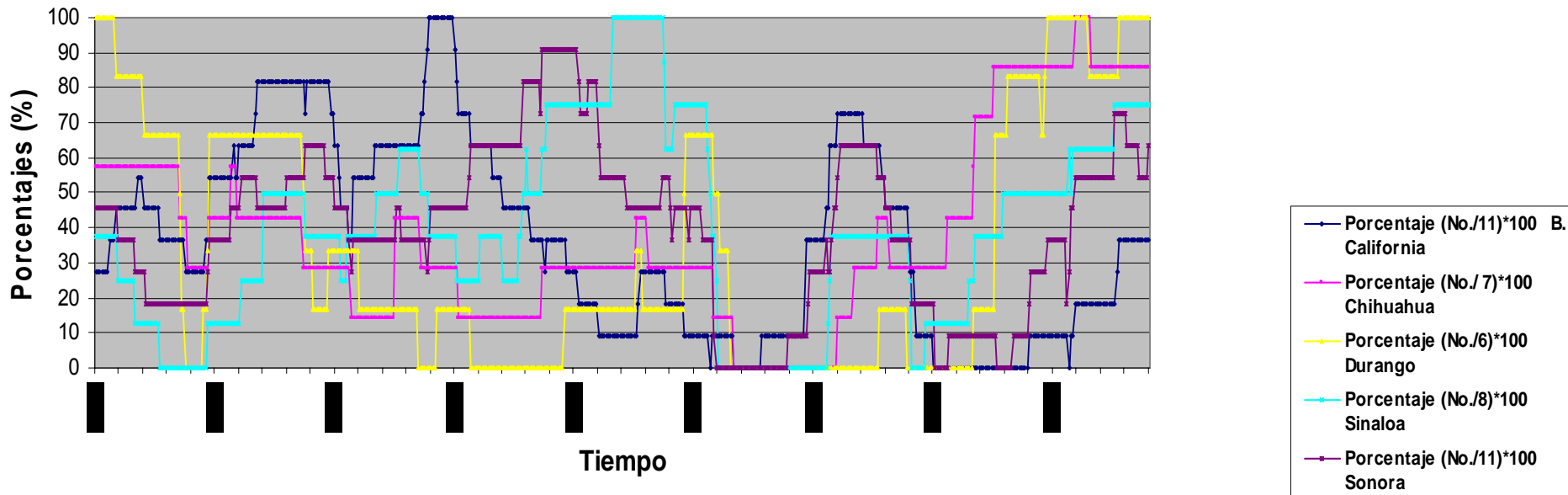
SPI 48 Promedio 38 Estaciones NO



Porcentaje de Estaciones en Sequía. Región Noroeste. 1954-2001



Porcentajes de Estaciones en Sequía. Baja California, Chihuahua, Durango, Sinaloa y Sonora. 1954-2001



REGIONAL CENTER FOR CLIMATE ANALYSIS (RCCA)

Hermosillo, Sonora

General Objective

Integrating work groups from different educational and governmental institutions in the region to form a Regional Climate Analysis Center for Northwest Mexico surrounding the Gulf of California. The Center will undertake analysis of the regional climate related data in order to develop tools and products that will benefit the diverse needs of different sectors in society.

Participating Institutions

Sonora: University of Sonora (Christopher Watts), CIBNOR (Luis Brito), CEDES (Julio Rodríguez), CNA GRNO (Lucas Oroz), INIFAP (José Grageda), ITSON (Jaime Garatuza), CEA (Medardo Meza), PC (Carlos Arias)

Baja California: CICESE (Teresa Cavazos), UABC (Rafael Cueto), CNA GRPBC (Manuel Colima)

Baja California Sur: CIBNOR (Sara Diaz), CICESE (Luis Farfán)

Sinaloa: UAS (Fernando Paez), INIFAP (Jaime Macias), CNA GRPN (Rafael Sanz)

Chihuahua: CEISS (Víctor Reyes), WWF (Héctor Arias)

Durango: CENID-RASPA (Ignacio Sanchez)

Arizona: UA [Greg Garfin (CLIMAS), Rob Kursinski (Atmo), David Meko (Tree Ring Lab)], ASU (Joe Zehnder)