



# MEAN CIRCULATION HIGHLIGHTS AND CLIMATE ANOMALIES

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## MARCH - APRIL 2002

The map of mean 500-mb height and height anomalies show generally above normal heights over much of the Pacific Basin, except for a stronger than normal trough at low latitudes northwest of Hawaii, mainly during April. A ridge extended north from middle latitudes of the Pacific into the Bering Sea and over Alaska, where surface pressures were well above normal. The Aleutian Low was noteworthy by its virtual absence, appearing only as a tiny 1016 mb contour in the mid-Pacific. The most extensive area of below normal heights in the Northern Hemisphere was over much of Canada, extending out across the North Atlantic, while to

the south, above normal mid-tropospheric heights and sea level pressures prevailed across most of the U.S. and middle latitudes of the Atlantic. The circulation was also somewhat more anticyclonic than normal over most of Europe, both at the surface and aloft.

Unusually cold air remained in place over most of Canada and southeastern Alaska, and frequent late-season Arctic outbreaks affected much of the central and northern sections of the Lower 48 States, especially during March. During April, the cold air remained over western Canada most of the time, and the strong Bermuda High expanded its area of influence northwestward, bringing early-season

warmth to much of the southern and eastern parts of the U.S.

Over the Eastern Hemisphere, a weak trough was located over central Asia but mid-tropospheric heights were above normal elsewhere. Most areas enjoyed above-normal temperatures, and excessively hot conditions developed over southeastern Asia and parts of the Indian subcontinent during April. Most of the two-month period was dry in Europe, where anticyclonic flow conditions prevailed.

Over the Pacific, La Niña conditions, characterized by below normal SSTs along the equator, were replaced in early March by moderately above

## March–April 2002

500 mb Height, Anomaly

Sea Level Pressure, Anomaly





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normal SSTs, indicating the early stages of a new El Niño. Atmospheric indices, however, remained in the neutral range, showing that the warming of the SSTs along the equator had not yet had much effect on the overlying atmosphere. Impacts of El Niño on the atmosphere are usually greatest during its mature stage, which is not expected for several months and are most effectively transmitted to the middle latitude circulation during the colder part of the year.

### MAY - JUNE 2002

The circulation during the late spring and early summer months was characterized by a band of fast westerlies extending from eastern Canada across the middle latitudes of the Atlantic, with a tendency for storms to stall just west of the British

Isles. Higher than normal pressure and generally anticyclonic conditions prevailed both at low latitudes and high latitudes of the Atlantic. Except for a blocking ridge over the west coast of Alaska and the Bering Sea, conditions were close to normal over the Pacific. No strongly anomalous circulation patterns were in evidence over the lower 48 states either, but this was due to highly variable conditions during the two months. May was on the cool side, with record low temperatures occurring in the Midwest and Northeast during the third week of the month, while June was predominantly warm, with hot weather, some of record proportions, developing over both the Southwest and the north-central states by the end of the month.

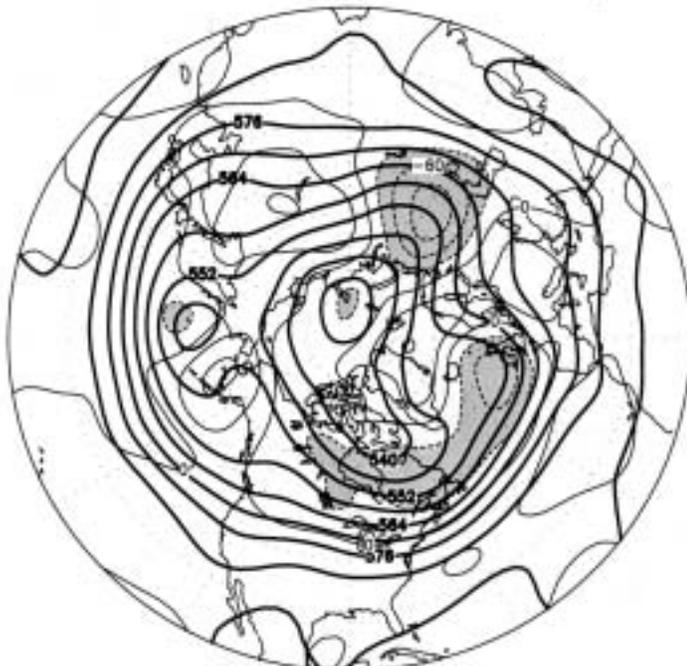
In Europe, temperatures were above

normal much of the time in northern areas, but hot weather developed over much of the southern and central parts of the continent during the latter part of June, where strongly anticyclonic conditions prevailed.

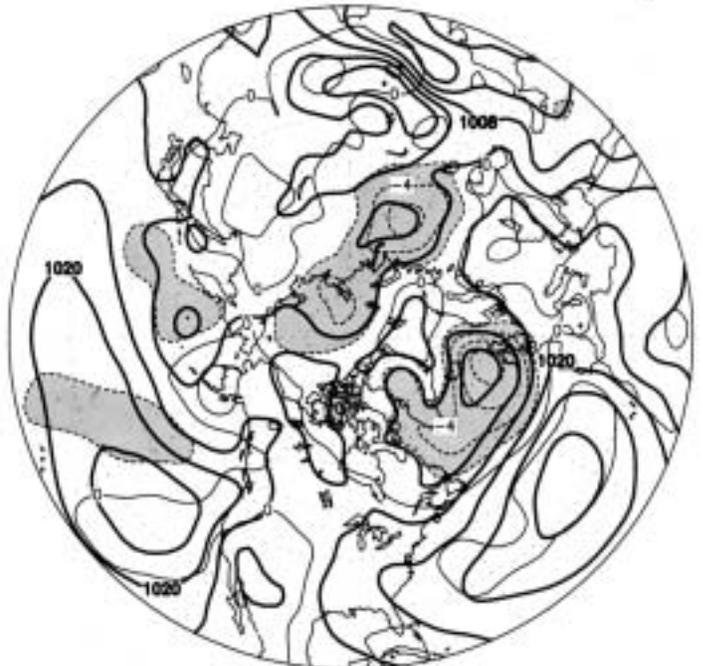
Over the tropical Pacific, El Niño conditions continued to develop. Equatorial SSTs were at least 1 C above normal over a wide area extending from just west of the date line to about 110W longitude. A strengthening of the Humboldt current prevented the warm water from reaching the coast of South America. The Southern Oscillation Index, often taken as a measure of the phase of El Niño conditions, was negative for the fourth consecutive month in June, suggesting that the El Niño was beginning to have an effect on the atmosphere.

### May-June 2002

500 mb Height, Anomaly



Sea Level Pressure, Anomaly

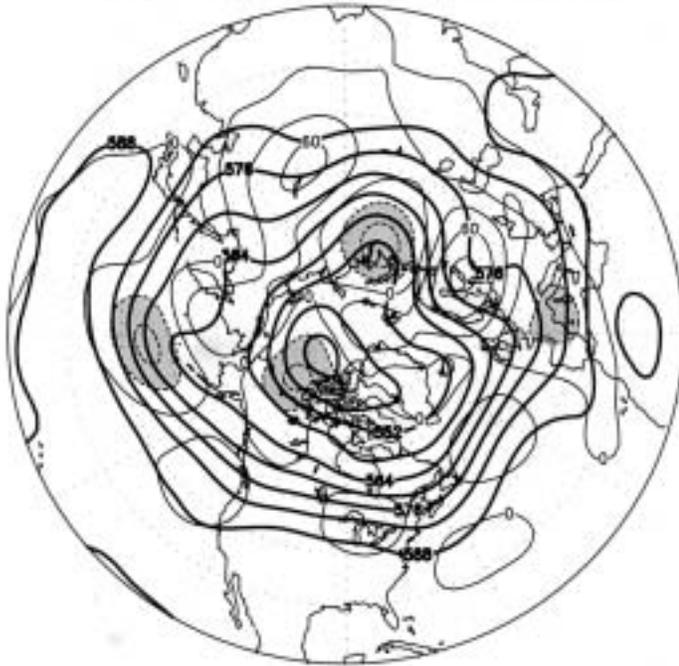




## July–August 2002

500 mb Height, Anomaly

Sea Level Pressure, Anomaly



### JULY - AUGUST 2002

Stronger than normal anticyclonic conditions were in evidence at most mid-latitude locations during July and August, especially over the eastern Pacific, the Great Lakes region, the central Atlantic, and Scandinavia. Vigorous troughs and cyclonic activity were confined to a small area of the central Pacific southwest of the Aleutians, the Arctic basin just north of the Canadian Archipelago, central Asia, and part of southern Europe and the Mediterranean Basin. The storminess in southern and central Europe was associated with record flooding in some areas during August, and extended into eastern Europe. Above-normal temperatures prevailed primarily over eastern Europe in July and the area of anomalous warmth

moved north to Scandinavia in August.

Record and near-record heat and increasing drought plagued many parts of the United States, and the summer as a whole (including June) ranked with the Dust Bowl summers of 1934 and 1936 and the recent hot summer of 1988 as among the hottest on record on a nationwide basis. Drought continued through most of the summer over much of the West and Southwest, where wildfires continued to be a problem. Drought began to develop in the eastern corn belt also under the anticyclonic flow pattern, following a spring that had mostly good rains.

Much of the Middle Atlantic area continued to have worsening drought, and the Northeast began to dry again

following fairly normal spring rains in most areas.

El Niño conditions continued to develop over the Pacific, and more atmospheric indices began to show its influence. Although typhoons were active over the western Pacific, dry conditions prevailed over eastern Australia and parts of Indonesia.

Eastern Pacific tropical storms were active also, but tropical activity over the Atlantic was relatively weak and infrequent until the very end of August, when several storms, mostly weak, formed in early September. All of these are typical atmospheric responses to El Niño conditions over the equatorial Pacific. ⚡