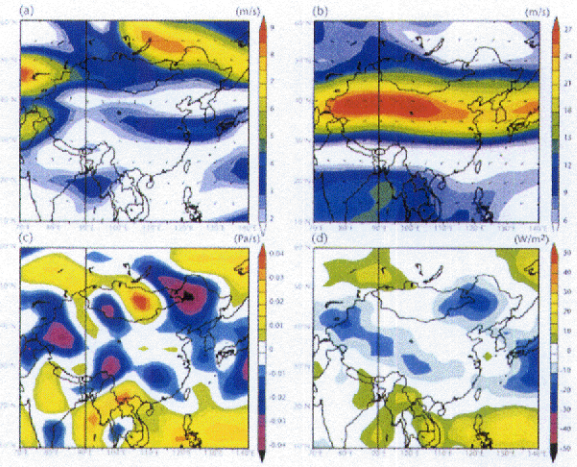

Figure II.43 Montage of climate indicators over Asia during June to August 1998: a) 250 hPa (approximately 10.5 km altitude) vector mean wind anomaly; b) 250 hPa vector mean wind; c) anomaly of vertical motion at 700 hPa (approximately 3 km altitude); and d) anomaly of outgoing longwave radiation.
[NOAA/CDC, USA]

March–August 1998

The El Niño event was in decline after May but above normal rain was recorded over two broad regions of China during June through August 1998 (see Figure II.42). The highest rainfall totals were over the Yangtze Basin in the south and the other region of above average rainfall was over northeast China extending into eastern Mongolia. Over the Yangtze Basin rainfall totals in the range 700–900 mm were common and some regions exceeded 1 000 mm. The combined effect of the heavy summer rains and those of the previous winter and the early snowmelt from the Tibetan Plateau was to cause many rivers to reach record levels. There was extensive flooding.

Based on historical records the two most important factors determining the strength of the summer monsoon over Asia are El Niño and the snow cover over the Tibetan Plateau. Both of these factors contributed to the main summer rainbelt being located further south than normal over the Yangtze River valley during the summer of 1998. The montage of maps of climate indicators in Figure II.43 identifies the effect of anomalous regional circulation on the rainfall patterns. The anomaly of high atmosphere wind flow (Figure II.43a) indicates that the axis of strongest westerly winds is further equatorward than normal over eastern China. The overall effect is that the maximum winds of the jetstream extend further eastward from the Tibetan Plateau and the axis of maximum winds shifts southward over eastern China (Figure II.43b).

The maps of anomalous vertical motion fields at 3 km (Figure II.43c) and anomalous outgoing longwave radiation (Figure II.43d) have patterns over eastern China that are consistent with the excess summer rainfall. There is enhanced upward motion (Figure II.43c — blue/mauve shading) over northeastern China and over southern China on the southern exit region of the subtropical jetstream. The regions of reduced outgoing longwave radiation (Figure II.43d — blue shading) over northeastern China and southern China generally coincide with the areas of increased rainfall.

Although there was heavy rainfall over southern China during the summer of 1998 the tropical storm and cyclone activity was again significantly below normal during the period. The first occurrence of a tropical storm making landfall over southern China during 1998 was not registered until early August. This is consistent with the historical record of few tropical storms forming over the western Pacific Ocean and South China Sea during an El Niño event, notwithstanding that the El Niño was in rapid decline after May 1998.

Impacts

China experienced major impacts from the climate anomalies experienced during and immediately following the period of the 1997–98 El Niño event. The regions of climate anomaly were in the subtropics and middle latitude and cannot be directly linked to the longitudinal shift in equatorial convection associated with El Niño. However, there is a high probability of causal relationships, at least into late spring of 1998. The climate anomalies, particularly rainfall and wintertime temperatures, over China are linked to persisting changes to the Northern Hemisphere subtropical jetstream characteristics. Similar patterns of climate anomaly, particularly those over northern China, have occurred during past El Niño events.

Drought occurred over parts of northern China because below average summer rainfall during 1997 persisted into autumn and winter of 1998. Some areas had their lowest precipitation for the period in 47 years. Most areas north of the Yangtze River were affected to some extent by the below average rainfall.

Winter floods are rare over southern China but the persisting rains and above