The above figure is a copy of Figure 12.9 from your text. It depicts an upper-level (500 mb) chart, and shows the evolution of conditions over a 24-hour period. Please note the following: (1) the longwaves (Rossby waves) have moved very little. (This is consistent with their average eastward speed of about 8 knots.) (2) each of the three shortwaves (labeled “1,” “2,” and “3”) have moved several hundred miles eastward. (This is consistent with their average eastward velocity being proportional to and nearly equal to the velocity of the 700-mb flow.) (3) Shortwaves tend to deepen longwave troughs as they move through them (#1 and #3), while shortwaves moving over ridges tend to weaken (#2). (4) As shortwaves move through troughs they tend to enhance baroclinic conditions. (Note the isotherms in panel (b) exhibiting strong baroclinic conditions near shortwaves #1 and #3 as they pass through longwave troughs. The resultant warm and cold advection is represented with red and blue arrows.) (5) The length of a typical longwave (as shown) is a little greater than the distance across the United States. Hence opposite weather conditions often occur simultaneously on opposite sides of the country.