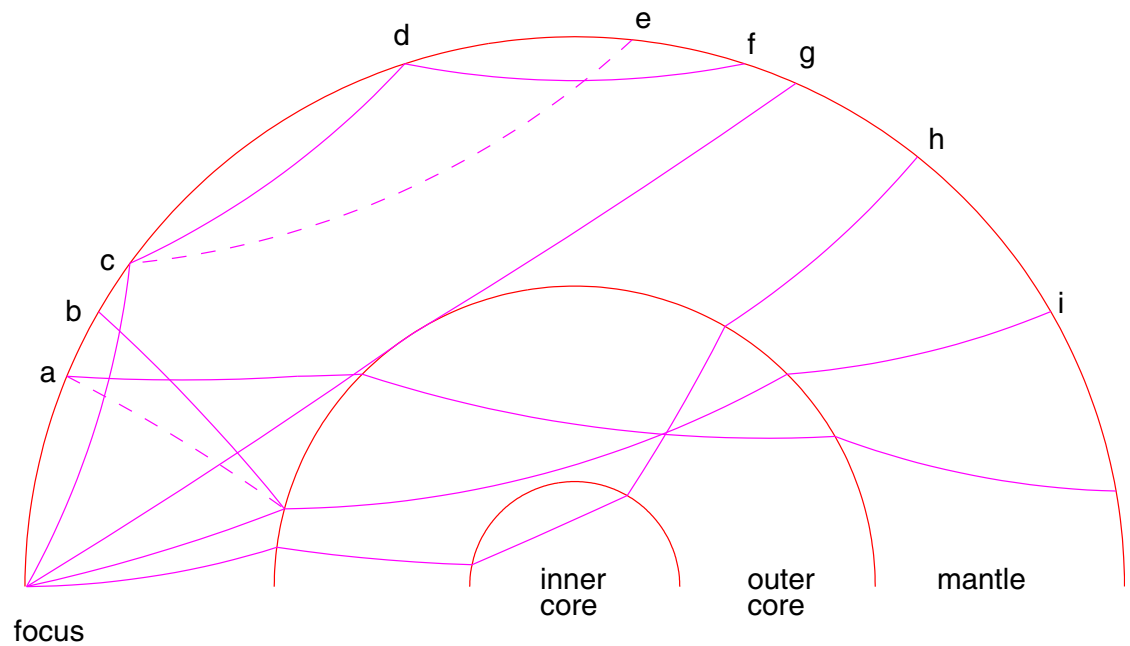## PRACTICAL 7: SEISMIC PHASES THROUGH THE INTERIOR OF THE EARTH

Name the seismic phases associated with the ray paths ending at points **a** to **j** in the figure below. Solid lines represent P waves and dotted lines S waves.

Why are the ray paths curved?

## PRACTICAL 7: TELESEISMIC PHASES AND THEIR TRAVEL TIMES

Teleseismic recordings are recordings at distance, such as the recordings from a largish earthquake at seismograph stations around the world. The figure overleaf shows the LPZ seismograms recorded at four seismograph stations from a magnitude 7.0 earthquake recorded on 30 January 1987 at four seismograph stations. The four stations are Bangui (BCAO) in the Central African Republic, Charters Towers (CTAO) in Queensland, Australia, Hobart (TAU) in Tasmania and Zongo (ZOBO) in La Paz, Bolivia. The P and S-wave phases are marked on the figure. We shall use these seismograms to find the origin time and locate the epicentre of this earthquake in practical 8.

Measure and draw up a table of their arrival times:

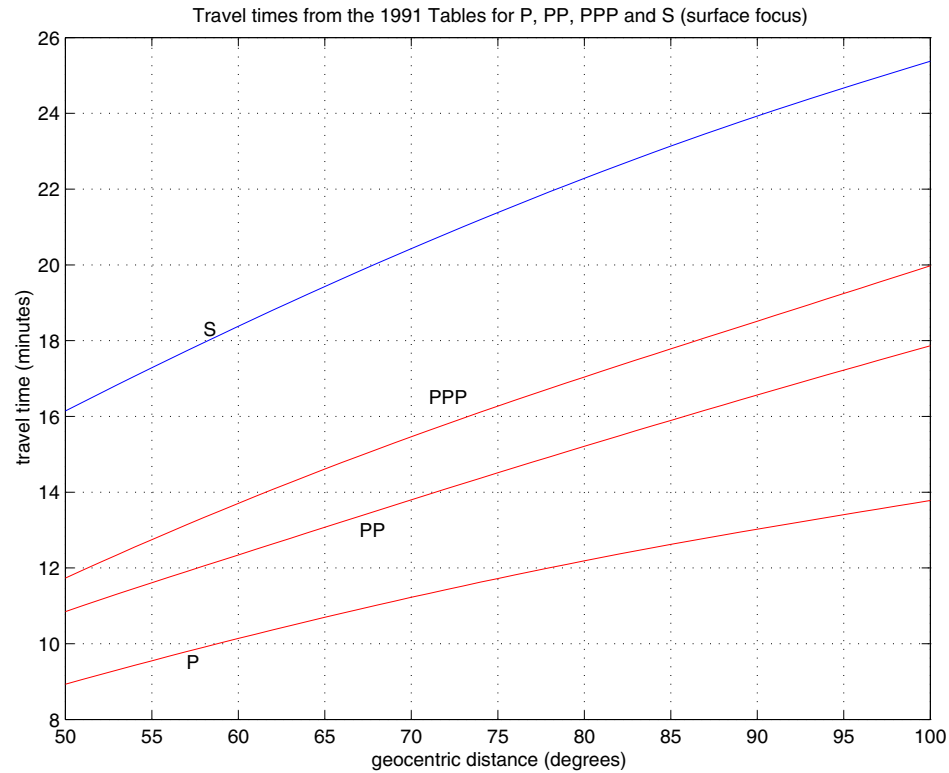| Station | Arrival Time (minutes after 22^h) | | $t(S) - t(P)$ min. | $t(P)$ min. | Distance $\Delta°$ |
	P	S			
BCAO					
CTAO					
TAU					
ZOBO					

1. For each station, calculate the difference $t(S) - t(P)$ in travel time between the P and S waves. Then use the graph of P and S-wave travel-times from a shallow earthquake on page 4 to estimate the P-wave travel time $t(P)$ to the station and the epicentral distance Δ from the earthquake to the station.

2. Use the travel-time graph to identify the phase arriving at CTAO with a peak at $22^h 48^m$.

3. The phase just before $22^h 52^m$ at CTAO is probably SKiKP. Sketch the ray path of this phase.

4. What are the travel times of the PP and PPP phases to ZOBO? How long after the P phase do they arrive? Identify the PP and PPP waveforms on the ZOBO LPZ seismogram.

LPZ recordings from an earthquake on 30 Jan 1987

minutes after 22^h
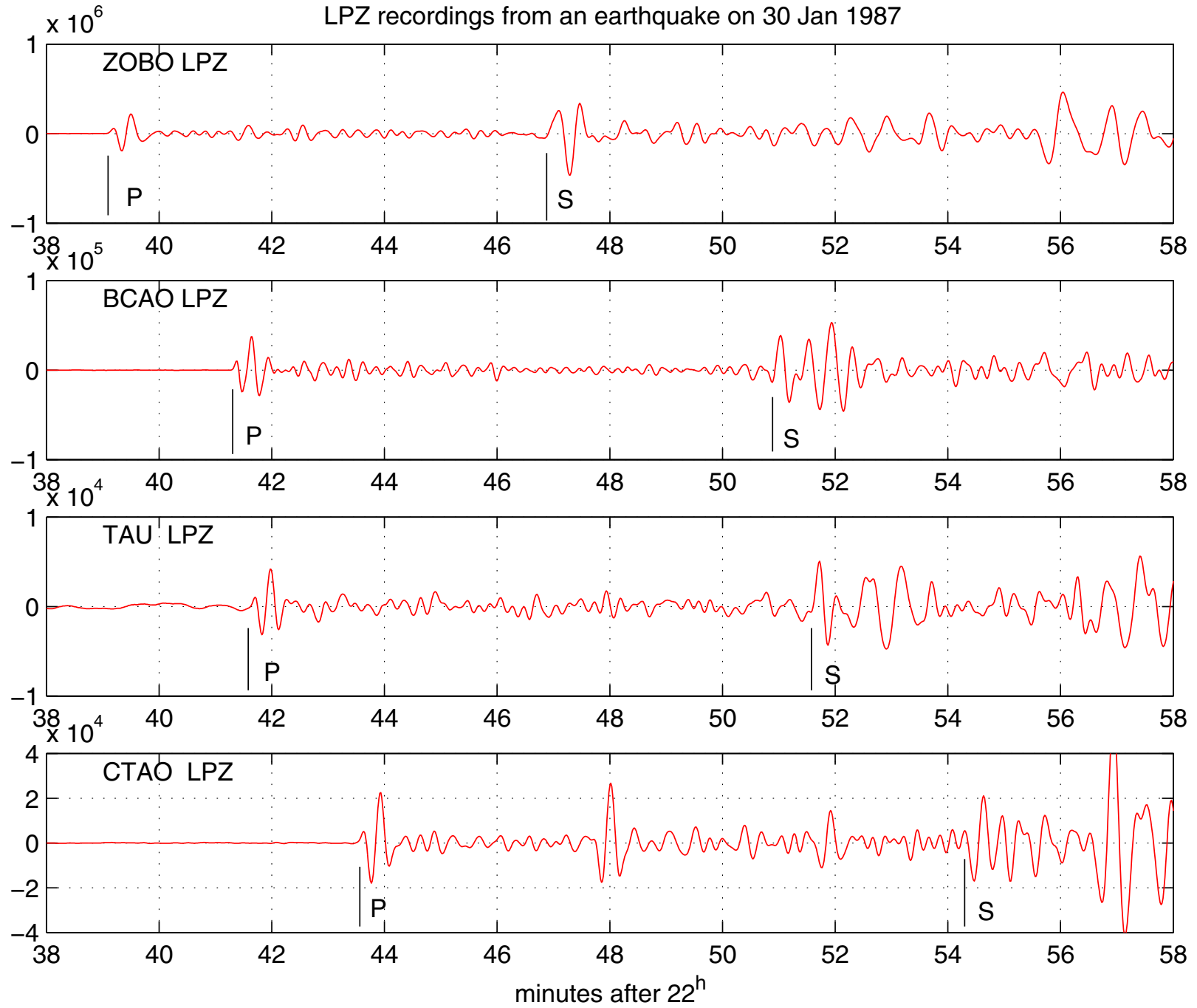
IASPEI91 TRAVEL TIMES FOR A SURFACE FOCUS

This graph should plot with a time scale of 1 cm $\equiv$ 2 minutes. The graph on the next page should plot with a time scale of 1 cm $\equiv$ 1 minute, the same as the time scale of the seismograms on page 3.

Travel times from the 1991 Tables for P, PP, PPP and S (surface focus)

Travel times from the 1991 Tables for P, PP, PPP and S (surface focus)