The Abdus Salam
International Centre
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Earthquake Tectonics and Hazards on the Continents

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Laboratory Exercises

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Earthquakes Exercise

1. What is the seismic moment of an earthquake with a moment magnitude of 7.5?

2. How many earthquakes of magnitude 4.5 would give a total seismic moment equal to that of a magnitude 7.5 earthquake? The amount of deformation in some area produced by earthquakes is proportional to the total seismic moment, assuming the earthquakes have similar mechanisms.

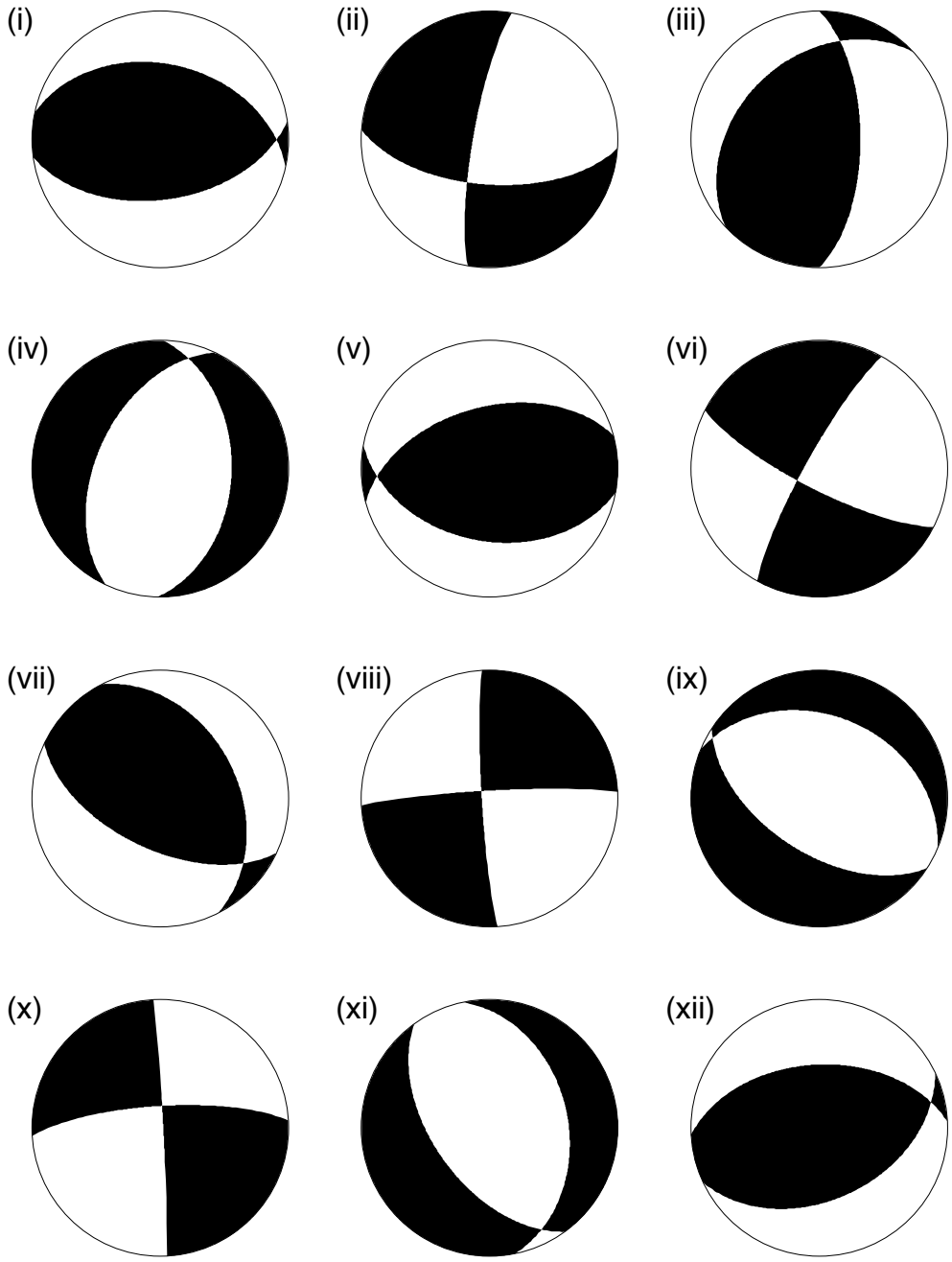
3. Make a rough estimate of the amount of slip and length of rupture expected for magnitude 6.5 and 7.5 earthquakes.

4. The figure attached shows the focal mechanisms for a number of notable earthquakes that have occurred in the Alpine-Himalayan belt over the past 15 years:

   a. 1999 Izmit, Turkey (M_w 7.4)
   b. 1999 Athens, Greece (M_w 6.0)
   c. 2001 Bhuj, India (M_w 7.6)
   d. 2001 Kokoxili, Tibet (M_w 7.8)
   e. 2003 Bam, Iran (M_w 6.6)
   f. 2005 Muzaffarabad, Pakistan (M_w 7.6)
   g. 2005 Qeshm Island, Iran (M_w 6.0)
   h. 2008 Yutian, Tibet (M_w 7.1)
   i. 2008 Wenchuan, China (M_w 7.9)
   j. 2009 LAquila, Italy (M_w 6.3)
   k. 2010 Yushu, Tibet (M_w 6.8)
   l. 2011 Van, Turkey (M_w 7.0)

   The order of the mechanisms in the figure is not the same as that in the list. For the exercise today, just say what type of mechanism each 'beachball' represents. However, over the next few days try to identify which mechanism corresponds to each of the above earthquakes.

5. Sketch the focal mechanism for earthquakes with strike, dip and rake equal to (a) 155/54/210, (b) 155/54/-30.


(i)
(ii)
(iii)
(iv)
(v)
(vi)
(vii)
(viii)
(ix)
(x)
(xi)
(xii)