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12.002 Physics and Chemistry of the Earth and Terrestrial Planets
Fall 2008

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Problem 1: The diagram on the attached page shows a geometry for a mid-ocean ridge spreading at a uniform rate of 40 mm/yr. After 5 m.y., the new lithosphere that has been created forms strips 100 km wide down each side of the ridge axis. Complete the diagram for the next two intervals of 5 m.y as new sea floor is created. Identify the nature of the plate boundary and the direction of offset at points A, B and C.

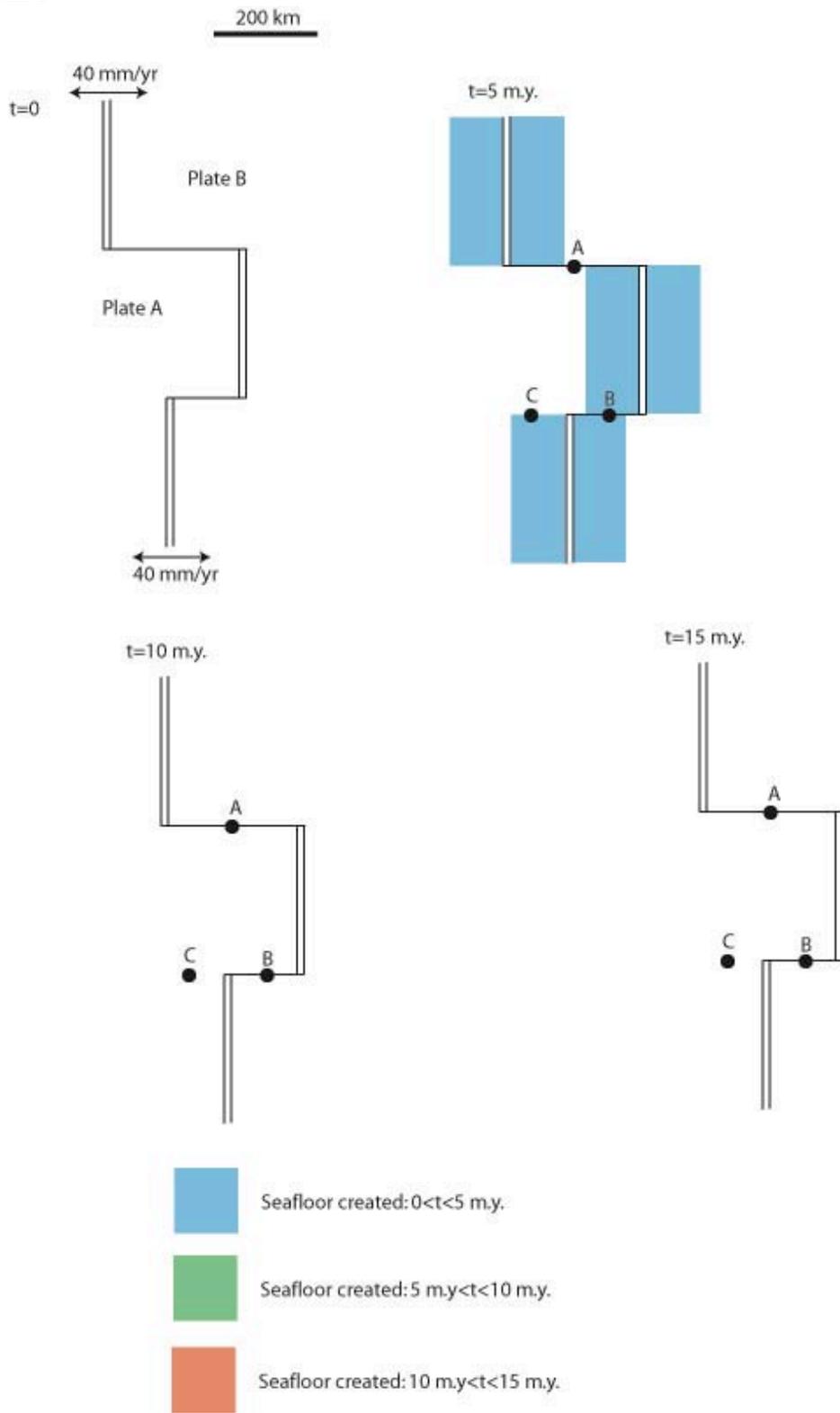
Problem 2: The diagram on the attached page shows a geometry for three mid-ocean ridges that meet at a point, called a triple junction. The spreading velocity between plates A and B is shown at 20 mm/yr.

(a) Using your knowledge that mid-ocean ridges spread orthogonally and symmetrically, construct the velocity diagram for this tectonic system and find the spreading rates for the other two spreading ridges. Make sure to put velocity units on your velocity diagram.

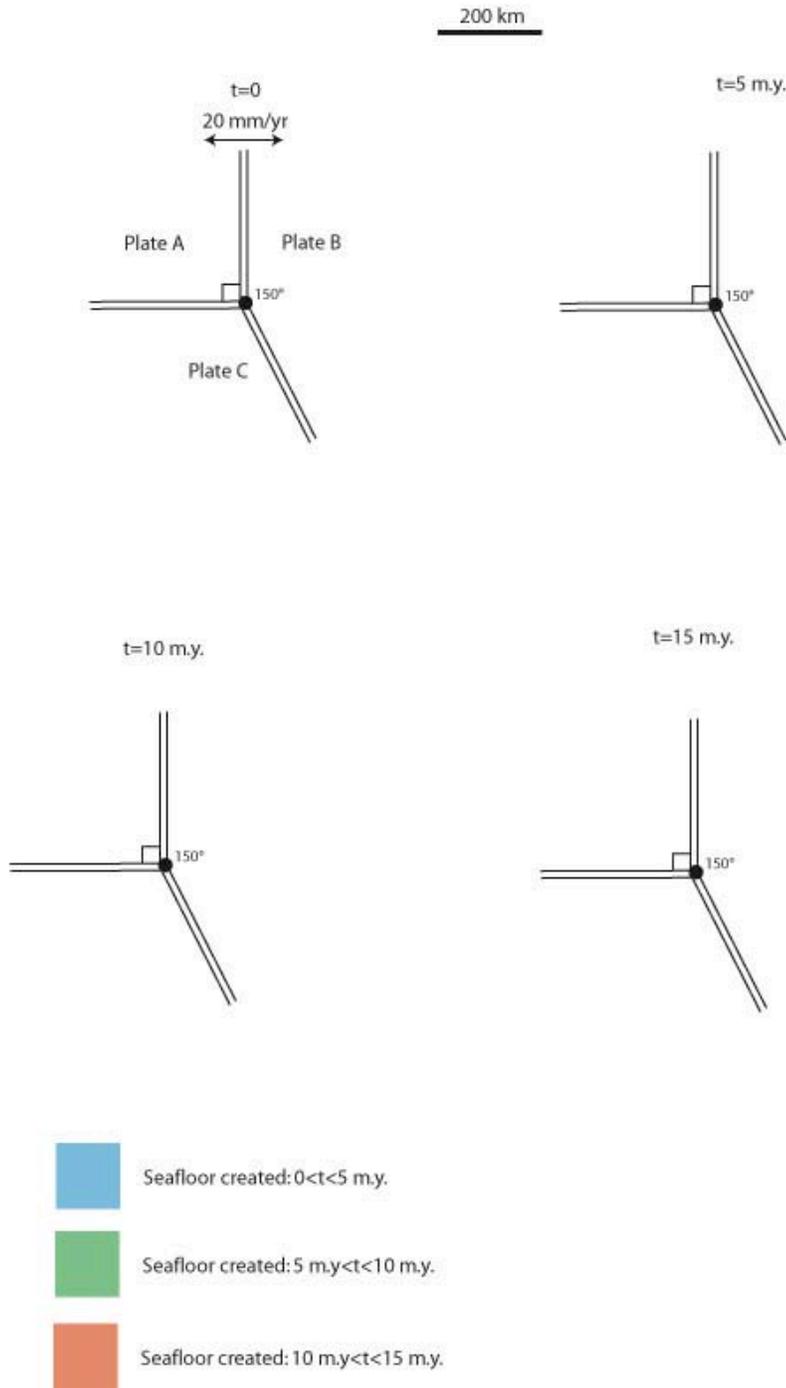
(b) Draw the pattern of sea floor created after spreading for 5, 10 and 15 m.y.

Problem 3: On the attached page is shown a plate diagram with two different velocity diagrams. For each, draw onto each plate boundary the appropriate symbol for spreading ridge, transform fault or subduction zone (pick any plate to be the upper plate). In words describe the nature of the boundary (ie left slip transform or convergence with a right slip component, etc.)

Problem 1



Problem 2



Problem 3

velocity diagram

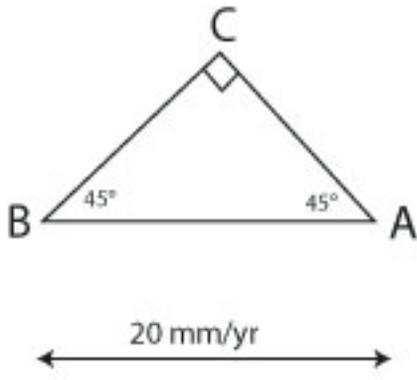


plate geometry

