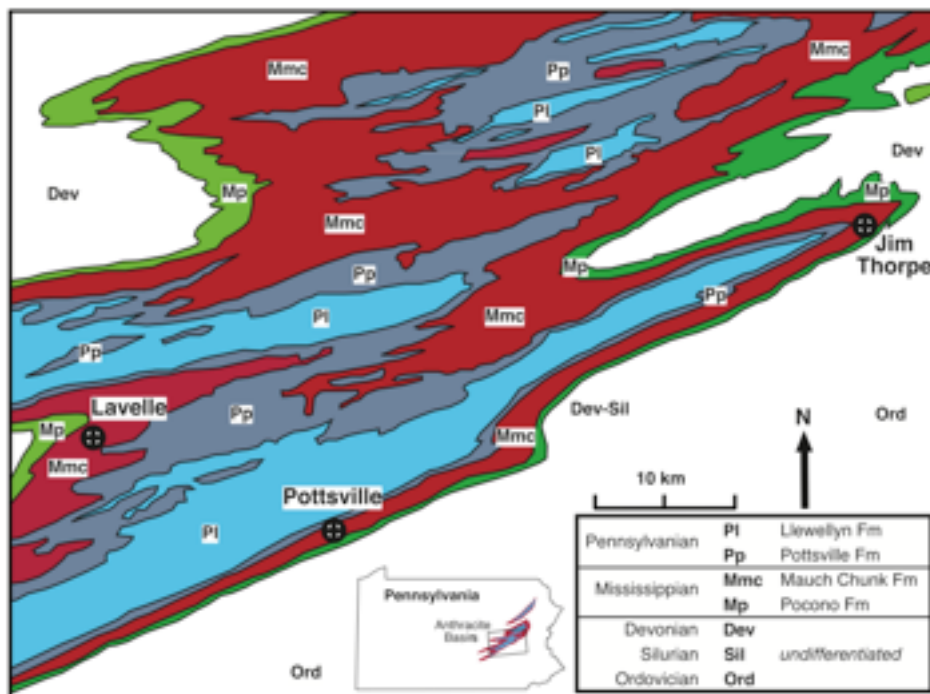


GLY 47 / GLY 511 - Plate Tectonics

Exercise 1 - Paleomagnetism and Continental Drift - Mauch Chunk Formation

The Mauch Chunk Formation of Pennsylvania contains red sandstones and siltstones of Upper Mississippian. The red color is due to hematite (iron oxide, Fe_2O_3) cement. Hematite is a very stable recorder of the ancient magnetic field. The average magnetic inclination determined from analysis of several hundred samples collected at three localities in the Mauch Chunk Formation was determined by Opdyke and DiVenere (2004) to be -20° (20° upward) for normal (northward directed) magnetizations. The purpose was to study reversals of the Earth's magnetic field rather than careful plate tectonic assessment, but the inclinations derived should give a reasonable approximation of the latitude of Pennsylvania in the Late Mississippian Period.



Remember that latitude and magnetic inclination are related by:

$$\tan(\text{inclination}) = 2 \tan(\text{latitude})$$

- 1) Find the latitude of the study area (average latitude of Pottsville, Lavelle, Jim Thorpe)
- 2) What should the magnetic inclination be at that latitude?
- 3) At what latitude did the rocks form?
- 4) How many degrees of latitude has Pennsylvania come since the rocks formed?
- 5) Calculate the average rate of drift (km per m.y.) and explain why this is a minimum estimate.