Project : Geology (Questions)

Due': March 29th, 2001

1. Consider minerals that consists of a combination of Cao and $Si0_2$. Represent Wollastonite ($CaSi0_3$), and Quartz on

   (a) the Cao-$Si0_2$ coordinate system.

   in each of the three units, oxygen, atom, and mass units

2. Consider the following silicate minerals described in (atom units) as mineral composition vectors in Ca-Si-0 space.

   Quartz = $\begin{bmatrix} 0 \\ 1 \\ 2 \end{bmatrix}$, Lime = $\begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}$, Larnite= $\begin{bmatrix} 1 \\ 2 \\ 4 \end{bmatrix}$, Wollastonite = $\begin{bmatrix} 1 \\ 1 \\ 3 \end{bmatrix}$,

   (a) Determine the dimension of composition space.

   (b) Describe the independent reactions among the phases of the system.

3. Describe an example of an assemblage of facies (different from amphibolite) which has a 5 dimensional composition space. Please use the matrix equations (in atom units) to establish dimensionality and the number of independent reactions.

4. (Just curious) Are phases solely determined by the ionic structure or are rocks occur in a standardised way that (I cannot but) can be written down ? There is a certain temperature/pressure variable involved here at which the rocks are found in these phases. (am I right on this ?)

[1] **Office hours:** Monday 1:30-3pm, 5-6pm, Wednesday 2:30-3:30pm, Thursday 1:30-3:00pm, Friday: 11:30-12:30 or by appointment.