- How does the initial tectonic state control the initiation and subsequent evolution of subduction?

    - This is a first order question: is subduction initiation the cause or effect of changes in plate motion
        - Many subduction zones in a given ocean basin appear to have formed simultaneously, implying that they were either induced by a global tectonic event, or that they were the cause of this event.

    - Naked forearcs are where we can get baseline information about the early evolution of arcs. We need to go to more than one place to determine whether there is diversity in arc evolutionary histories, and also to address the question of how subduction begins and its affect on global geodynamics

    - We discussed studying modern analogues of subduction initiation (e.g. rifts intersecting trenches) but consensus seemed to be that the analogy is not entirely complete and that tectonic complexities render these settings questionable as models of SI processes.

- How do plate kinematics, deformation, and petrology change before, during, and after initiation of subduction?

    - Geochronology of magma generation, and kinematic information (such as plate reconstructions, structural evolution) are important for geodynamic modeling of SI and arc evolution.
    - The only place to study the kinematics and deformation of active subduction initiation would be the Puysegur ridge. This would be a snapshot of its current state. However, it is uncertain whether this is the beginning of a new major subduction zone and how applicable this setting is to SI overall.
    - The compositions of early-arc magmas dramatically impact the overall composition of at least some arcs because their large proportional volumes. Knowing the compositions of these magmas and their volume proportions are crucial for understanding the overall compositions of these arcs and their potential roles as the progenitors of continental crust.

- How do the early products of island arc magmatism relate to the dynamics and conditions of subduction initiation?

    - We are beginning to understand the progression of lava geochemistry with time after SI until the first normal arc volcanism. This still is not tied to the dynamical processes.

- There was concern that the effects of variations of conditions at the beginning of subduction on arc evolution was intractable on the time frame of GeoPRISMS because so little is known about the early evolution of most arc systems.
- Ophiolites are potential locations to look at SI sequences on land and in detail. However, there was no consensus about whether ophiolites truly are appropriate analogues for early arc sequences

- What controls the rate of subduction and the 3-D structure and geometry of a subduction zone over time, and how are these related to magmatism at the surface?

AND

- What controls the distribution of volcanoes in space and time?

  - Geodynamic modeling is ready to explore evolution of slabs. What's needed collaboration between geodynamicists and geologists/petrologists studying the timing of kinematic changes in the overriding plate, and evolution of chemical compositions of magmas over long time periods (> 10 Ma).
  - This was already addressed in MARGINS. The question is how to make progress over the life-span of GeoPRISMS. Progress in studies of arc outputs might be made through collaborative investigations of lava geochemistry and seismic observations and other geophysical methods to map out magma distribution in the mantle and deep crust.
  - This topic wasn't covered thoroughly in our discussions.

Priorities: No consensus

- People convinced that we need a lot more information about the early evolution of subduction systems
  - One SI sequence moderately well studied, but even that one lacks some basic information

- Geology informing geodynamic models and vice versa

Theme versus primary site

- Need to go to more than one site to characterize variation in the mechanisms and results of SI
- Practically speaking: Over the 5-10 year time frame, we need to work in areas that have some background information about the geology (e.g. dredging, bathymetry)
- Specific site attributes needed are: Basic geology and geochronology on magmatic units as well as high-resolution 3-d geophysics

- Ancillary studies on poorly studied forearcs and on-land sites could be valuable.