March 4, 2008 Day 2

Summary of Science Requirements

Carbon Stocks - A global map of aboveground woody biomass

General agreement about requirements, but need clear documentation of why.

1. Spatial resolution
   ≤100m (scale of disturbance)

2. Accuracy (per pixel)
   ± 10 tC/ha or ± 20%, whichever is greater,
   with an upper limit of + 50 (?) tC/ha

Again, need simulations/experiments showing the effect of lower accuracies, coarser resolutions.

3. How often?
   5 years may be necessary to obtain the accuracy requirements, above.
   Global maps after 1, 2, 3 years would be of lower accuracy.

4. What structural variables?
   Aboveground biomass: canopy height, height index, volume (profile, waveform), canopy texture

5. Other requirements for models (initialization, validation)
   Are short forests young (growing) or stunted (not growing)?

Disturbance and Recovery

1. Types of disturbance
   a. All types, anthropogenic and natural
   b. But not individual tree falls

2. What structural variables?
   Aboveground biomass: canopy height, height index, volume (profile, waveform), texture

3. Spatial resolution
   < 100m

4. Temporal resolution
   Frequent for disturbance (monthly?; much less frequent for recovery)

5. Accuracy requirements
    Resample the same lidar points (?)
    Otherwise, same requirements as for carbon stocks?

Biodiversity, Habitat, and Structure

1. Accuracy (Not quantified as well as for carbon or disturbance) (Not driving the requirements)
    a. Canopy height (1m)
    b. Habitat heterogeneity
    c. Successional stage
    d. Surface roughness

Other thoughts and observations

1. The requirement for accurate carbon stocks (good spatial coverage) is counter to the requirement of disturbance & recovery (repeat sampling).

Do we have to choose one question for primary focus? Carbon stocks or Disturbance & recovery? Or can we work the trade-offs, and investigate both?

2. "One of the elephants in the room is old growth forests." We won't be able to observe changes in carbon stocks over large regions.

But we may be able to identify the fluxes of carbon associated with disturbance and initial recovery (young successional). Can models determine the flux to/from old growth forests?? (Currently we don't know the relative contributions of disturbance (short-term) and old-growth (long-term) to carbon balance. Furthermore, old growth may be more complicated (Hank's overshoot).)

3. Regarding model needs, can we distinguish between young and stunted forests? Repeat looks?

Next:

The Challenge: To identify and design the measurement systems to satisfy these science requirements.