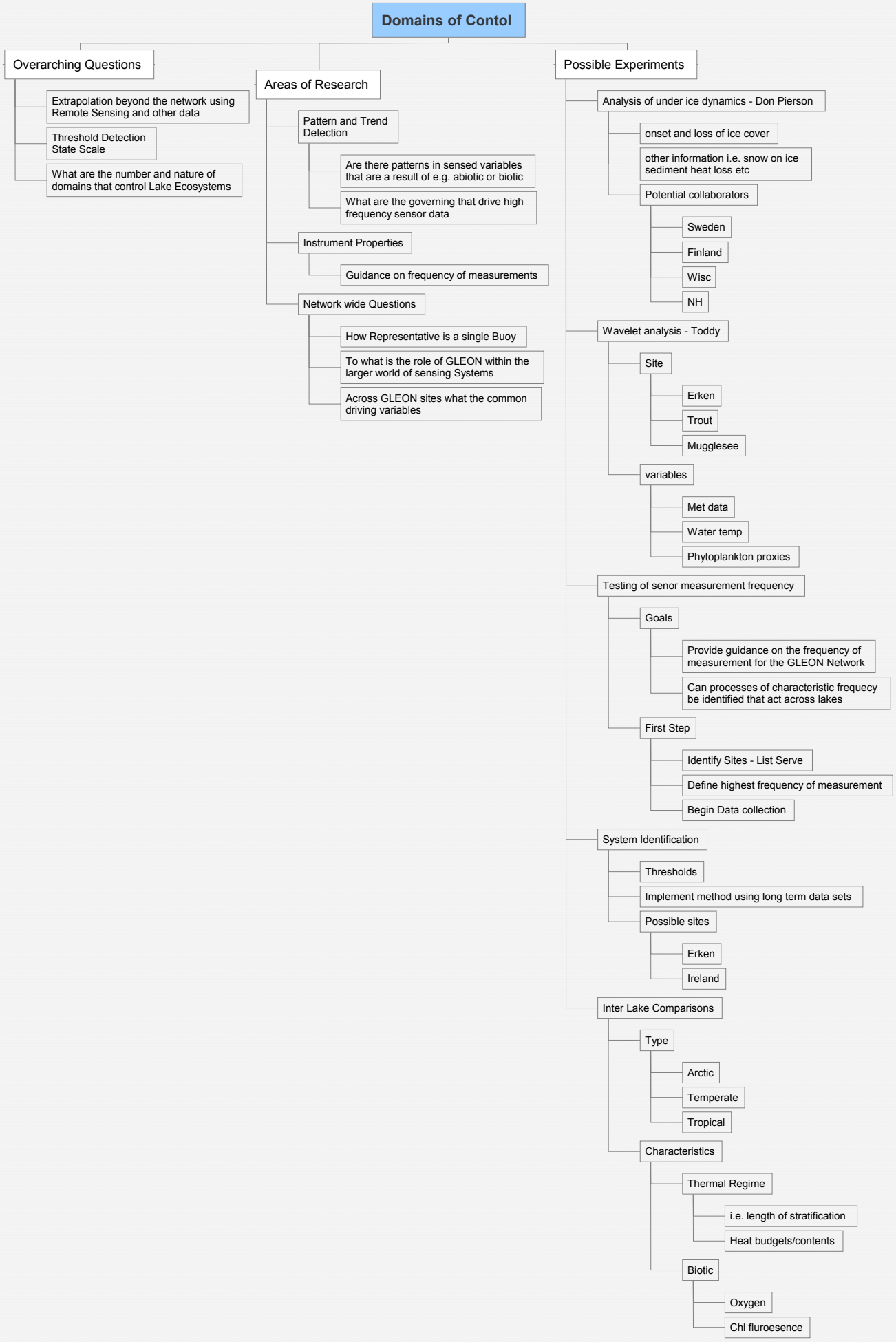
Domains of Contol
Overarching Questions
Extrapolation beyond the network using Remote Sensing and other data
Threshold Detection State Scale
What are the number and nature of domains that control Lake Ecosystems
Areas of Research
Pattern and Trend Detection
Are there patterns in sensed variables that are a result of e.g. abiotic or biotic
What are the governing that drive high frequency sensor data
Instrument Properties
Guidance on frequency of measurements
Network wide Questions
How Representative is a single Buoy
To what is the role of GLEON within the larger world of sensing Systems
Across GLEON sites what the common driving variables
Possible Experiments
Analysis of under ice dynamics - Don Pierson
onset and loss of ice cover
other information i.e. snow on ice sediment heat loss etc
Potential collaborators
Sweden
Finland
Wisc
NH
Wavelet analysis - Toddy
Site
Erken
Trout
Mugglesee
variables
Met data
Water temp
Phytoplankton proxies
Testing of senor measurement frequency
Goals
Provide guidance on the frequency of measurement for the GLEON Network
Can processes of characteristic frequecy be identified that act across lakes
First Step
Identify Sites - List Serve
Define highest frequency of measurement
Begin Data collection
System Identification
Thresholds
Implement method using long term data sets
Possible sites
Erken
Ireland
Inter Lake Comparisons
Type
Arctic
Temperate
Tropical
Characteristics
Thermal Regime
i.e. length of stratification
Heat budgets/contents
Biotic
Oxygen
Chl fluroesence

GLEON Domains of Control Working Group

First Draft Notes by Don Pierson

Larger Questions

There were a number of overreaching questions that were discussed by the group. These can be characterized as questions that will define the long term activities of the group and influence the direction of research carried out by the group, but at the same time are too large to be answered by any single research project.

1. How can the highly detailed temporal data collected by GLEON sensors be extrapolated beyond the network using Remote Sensing and other data?
2. How can Sensor data be used to detect changes in ecosystem state? At what scale can state changes be detected? What are the Thresholds of Detection and how can these be determined?
3. What are the number and nature of domains that control lake ecosystems?

Areas of Research

Three general areas of research were identified that could be addressed by the domains of control group. In our initial discussions there was a strong emphasis on testing different methods (i.e. spectrum analysis, wavelet analysis) as means of identifying the frequency of variation in key (measurable) ecosystem properties that can be linked to variations in controlling variables acting on the ecosystem.

1. Pattern and Trend Detection
    a. Are there patterns in sensed variables that are a result of specific abiotic or biotic processes?
    b. What are the governing processes that can be detected using high frequency sensor data?
2. Instrument Properties - guidance on frequency of measurements.
3. Network wide Questions
    a. How Representative is a single Buoy?
    b. What is the role of GLEON within the larger world of sensing Systems?
    c. What the common driving variables across GLEON sites?

Proposed Experiments

A number of experiments were identified by the group that could be started in the next few months, be carried out using data from multiple sites within the GLEON network, and which hopefully would lead to manuscripts within the next 12-18 months..

1. Analysis of ice cover dynamics using water temperature measurements - **Don Pierson**
    a. Automated detection of onset and loss of ice cover

    b. Other information could also be derived i.e. snow on ice sediment heat loss etc

2. Wavelet analysis - **Thorsten Blenckner**
    a. Sites
        i. Erken
        ii. Trout Lake
        iii. Mugglesee
    b. Variables
        i. Met data
        ii. Water temp
        iii. Phytoplankton proxies

3. Testing of senor measurement frequency - **Who is in charge???**
    a. Goals
        i. Provide guidance on the frequency of measurement for the GLEON Network
        ii. Can processes of characteristic frequecy be identified that act across lakes within GLEON Network
    b. First Steps
        i. Identify Sites
        ii. Define highest frequency of measurement
        iii. Modify data logger programs at selected sites in order to collect data at the frequency of measurement defined by the group discussion. Begin data collection.

4. System Identification -**Fang-Pang Lin**
    a. Thresholds
    b. Implement method using long term data sets
    c. Possible sites
        i. Erken
        ii. Ireland