Assessing land use/cover change impacts on carbon sequestration under various climate scenarios in China – Preliminary Results

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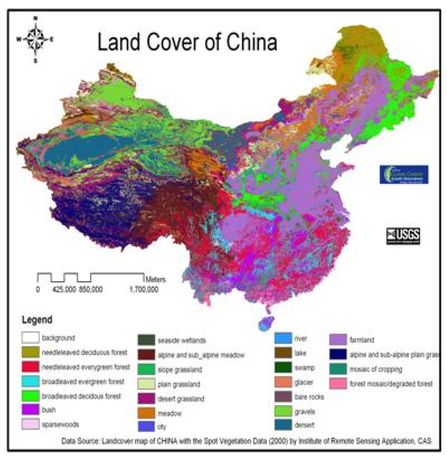
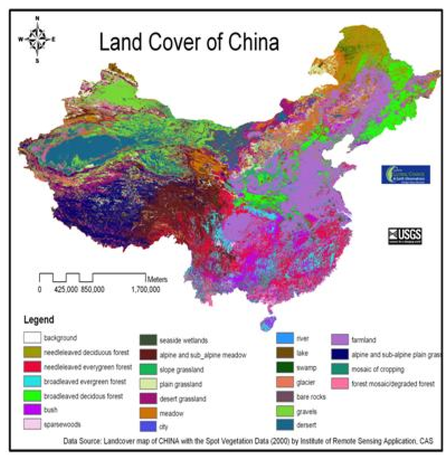
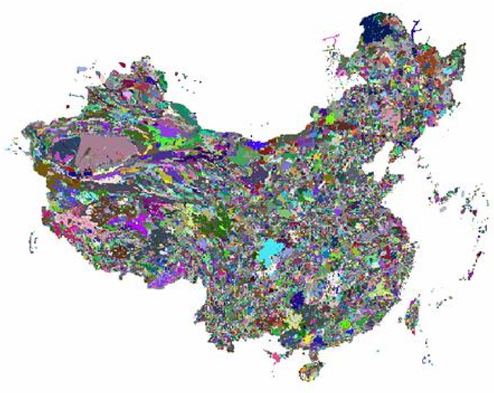
Introduction

- Significant changes in land use and land cover over the past two decades in Chin
- Environmental consequences are generally negative
- Carbon stocks and sequestration is largely unknown (uncertainty is high)
- There is a need to quantify the impacts of LULCC on carbon and assess the future change (trend)

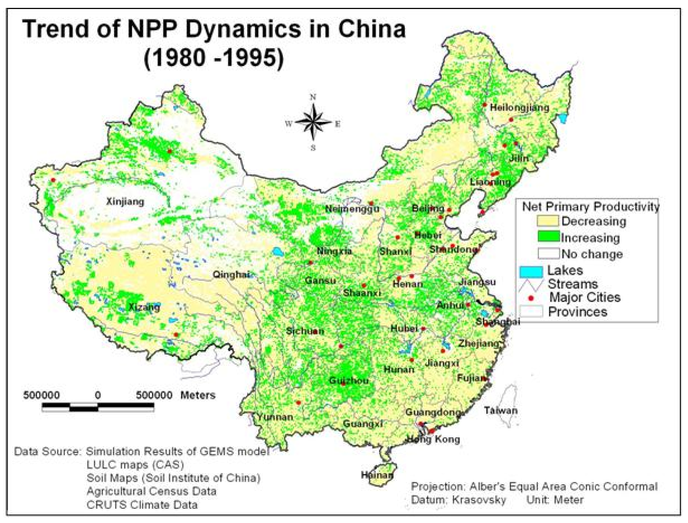


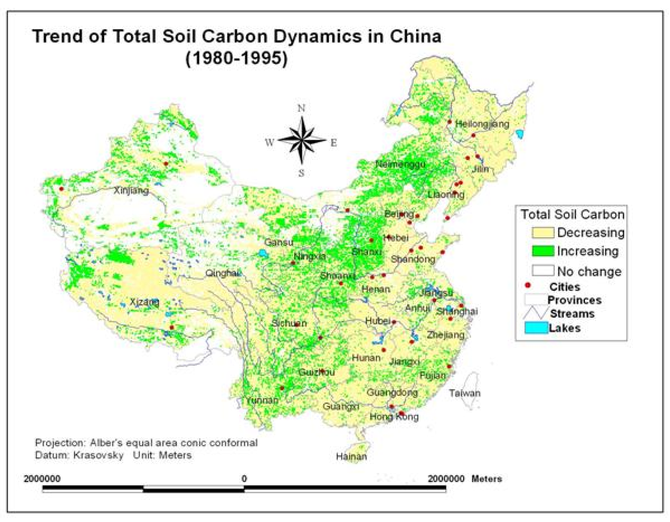




Objectives

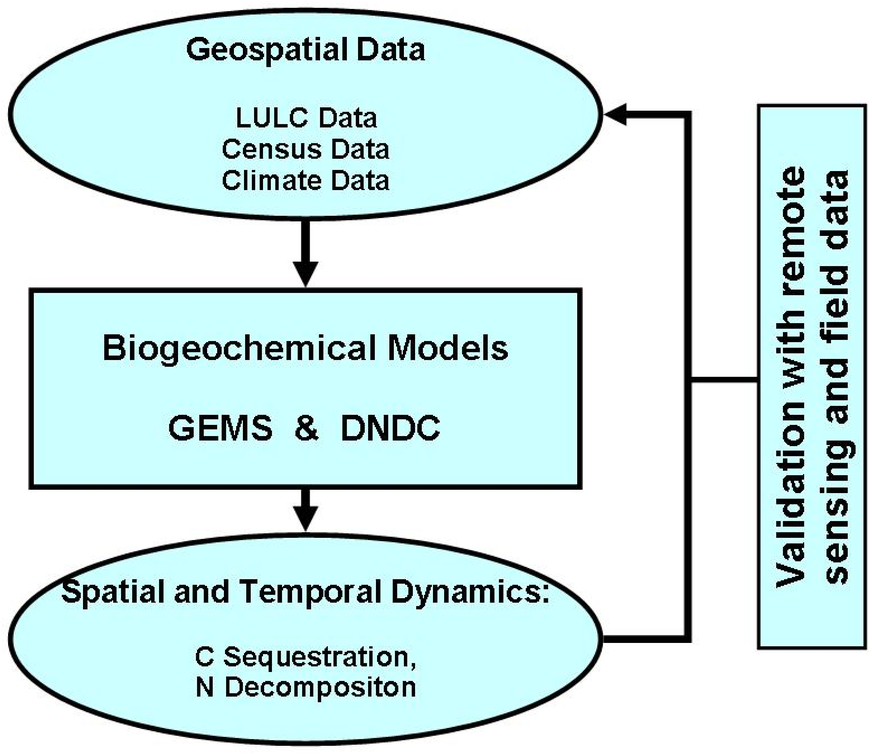
- Assess the trend carbon sequestration changes due to land use and land cover change
- Discern climate impacts from human induced disturbances on ecosystem productivity
- Assess the future changes in ecosystem productivity under current and future climate variability



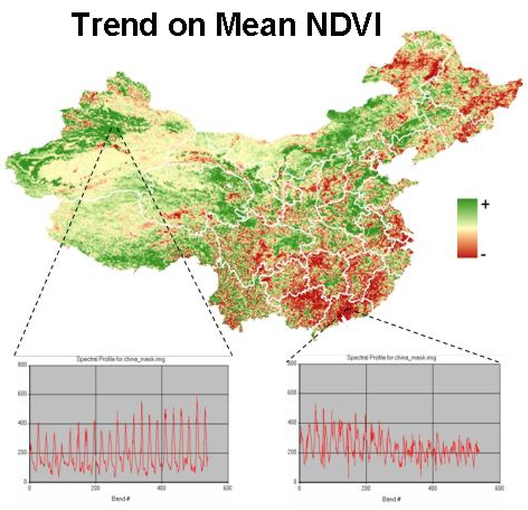


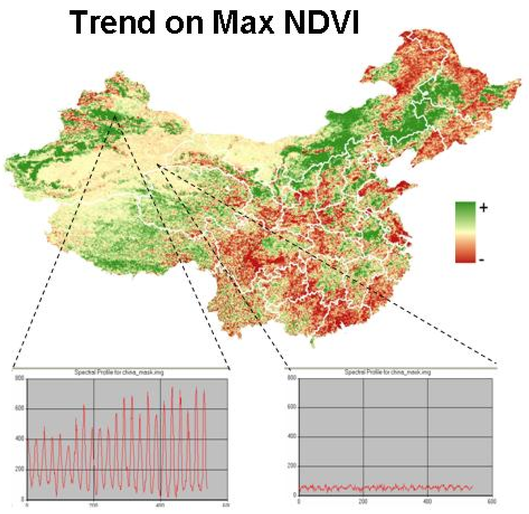
Approach

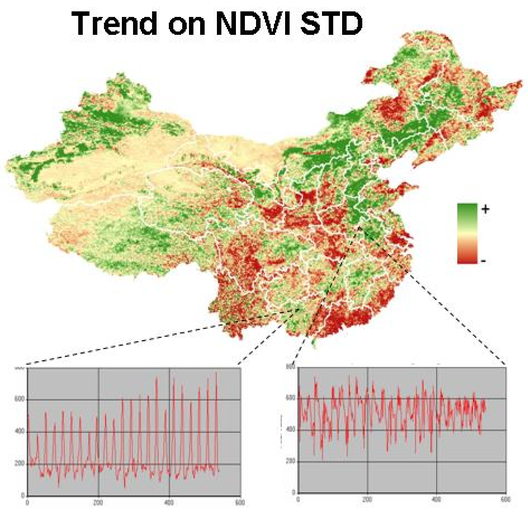
- Characterize land use and land cover change, as input to biogeochemical models (GEMS and DNDC) to assess the impacts on carbon sequestration
- Simulate future climate scenarios using regional climate models (RAMS)
- Run the biogeochemical models under various simulated climate scenarios to investigate the interaction between climate and human disturbance on carbon sequestration

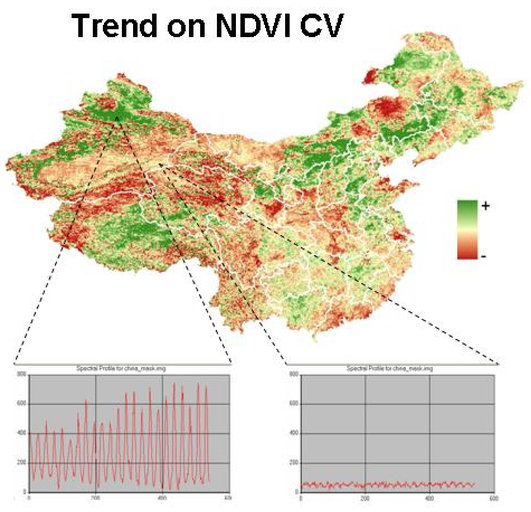


A modeling framework for simulating C and N using geospatial data and biogeochemical models









Results and Discussion

- Significant changes in C sequestration both above and below ground (soil) due to changes in land use and land cover over the past two decades
- Human disturbances are evident and exhibit a spatial patterns unrelated to climate change
- Long term remote sensing observations and statistical analysis showed an interesting patterns of change. Human intervention (such as afforestation or degradation in the dryland areas) can be observed and resulted in an increase in greenness. This increase in greenness did not seem to spatially correspond well with the biogeochemical modeling results, which could be due to uncertainties in either modeling or satellite observations.
- Time series analysis suggested that less productive areas (drylands in the western part of the country) seem to have gone through a major disturbance than productive coastal regions.

Figure Legends

- Top: Land use, soil, and climate data used in the simulations
- Simulated changes in NPP and soil carbon from 1980 to 1995
- Trends in vegetation changes as indicators of human disturbances or climate variability. The NDVI trend in CV suggest more interannual disturbances in arid regions.
- C and N spatial distributions are being simulated under different climate scenarios (A1 and B2)

Acknowledgement

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