Tracking forest disturbance in Northeast China's cold temperate forests using a temporal sequence of Landsat data

Xiang Jia, Guoqi Chai, Lingting Lei, Mengyu Chen, Zongqi Yao, Xiaoli Zhang, and Xin Tian

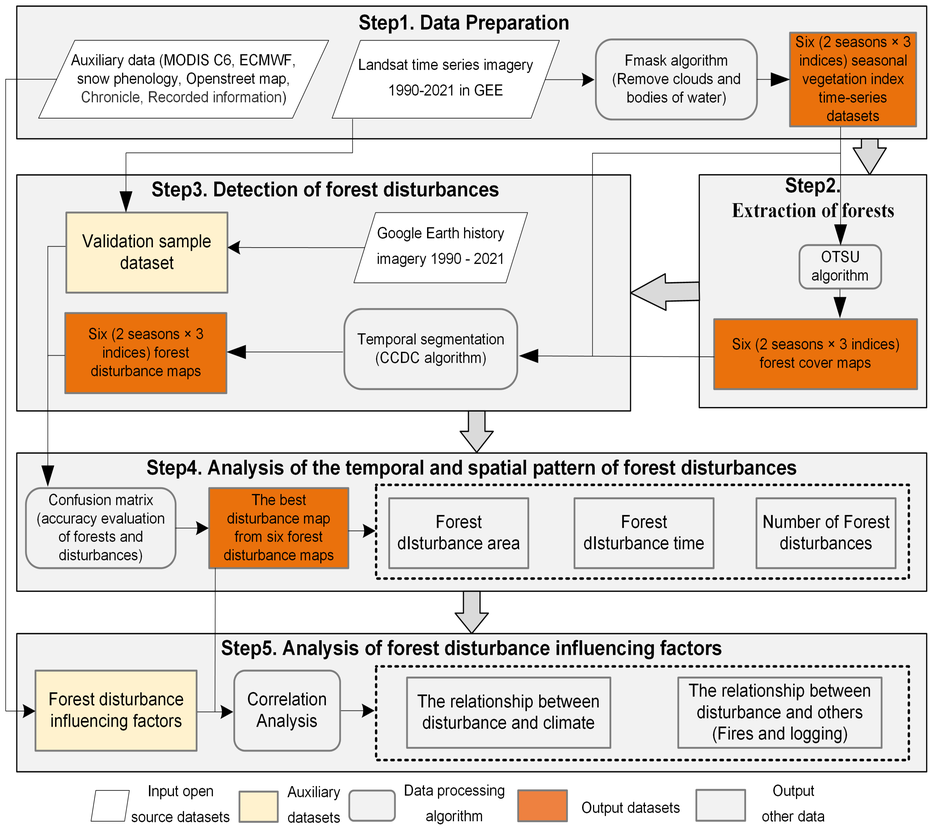
How to detect forest disturbance of Cold-temperate forest (CTF) ?

Why detect forest disturbance of CTF in northeast China:

- The CTF ecosystem has been severely damaged in recent decades because of some effects, but research on disturbance is limited.
- Landsat is heavily influenced by meteorological conditions.
- Historical statistics on forest disturbance in China are limited, as is the collecting of training samples for damaged forests.

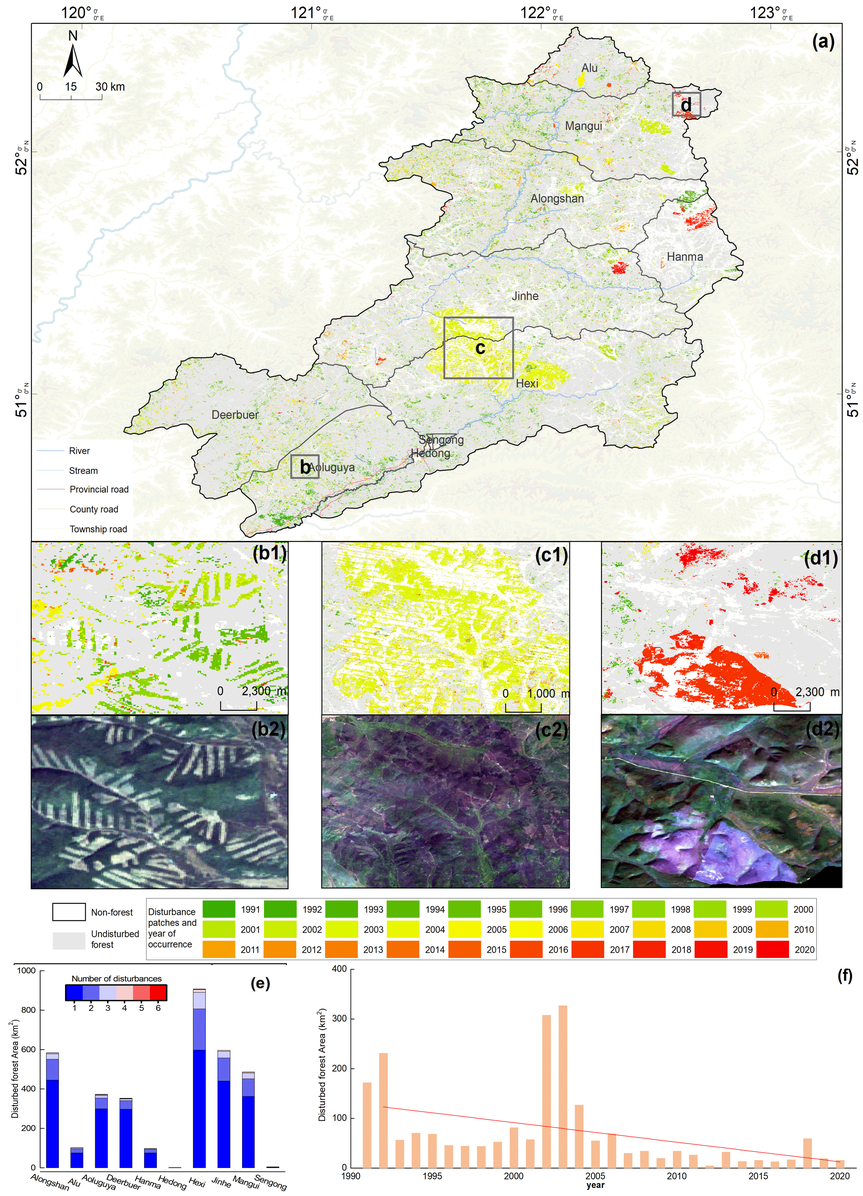
Our contributions:

- OTSU algorithm used for extracting the forest area of CTF.
- Improving CCDC with spectral indices and temporal features to capture disturbance.
- Assessing the correlation between disturbance of CTF and influencing factors.



Forest disturbance analysis workflow

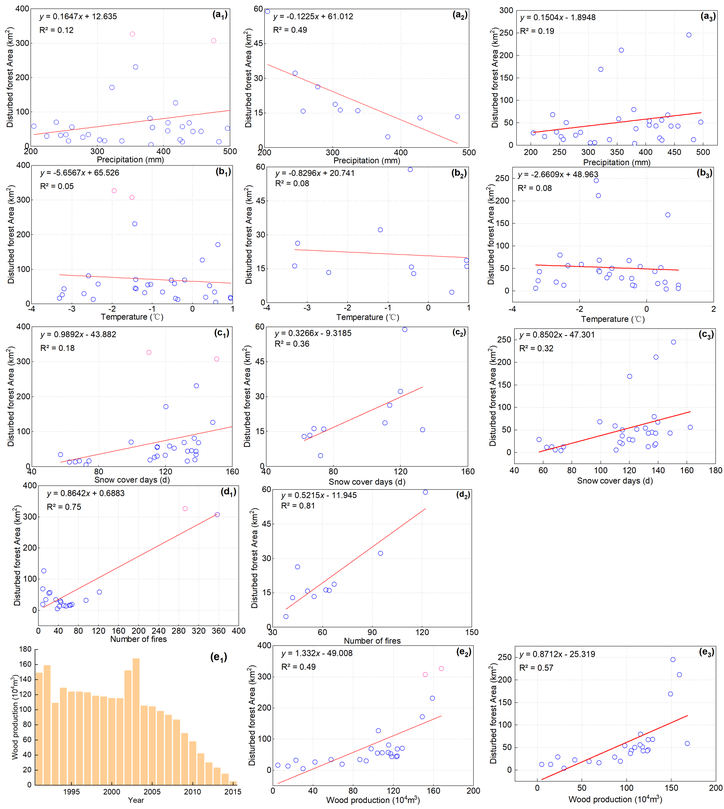
Occurrence pattern of forest disturbance



Forest disturbance extraction

- The disturbance events were common and widespread.
- The farther away from roads and rivers, the less disturbance there was, and the disturbance in nature reserves was also relatively low.
- Disturbance events decreased slowly, with abrupt disturbances dominating.

Influencing factor of forest disturbance



The Relationship between forest disturbance and its influencing factors

- Fire rather than climate is the main influence on forest disturbance, mainly because this is a tundra area which stores large amounts of CH_4 and is prone to wildfires.
- During the active period of commercial logging, disturbance was more strongly correlated with commercial logging and fire, both of which largely determined the distribution of forest disturbance across Genhe.
- With the gradual ban on commercial logging, the impact of fire on disturbance has been further accentuated.