The role of environmental, socioeconomic, institutional, and land-cover/land-use change factors to explain the pattern and drivers of anthropogenic fires in post-Soviet Eastern Europe: a case study comparison of Belarus, European Russia, and Lithuania

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Background
In this NASA Land-Cover/Land-Use Change Early Career Scientist Project, we are completing the following: 1) map land-cover/land-use (LCLU) change from agricultural land abandonment, cropland reestablishment, and afforestation in Belarus, European Russia, and Lithuania from 1990 to 2010 using moderate to high resolution satellite data; 2) analyze relationship of LCLU change with socioeconomic conditions, land management practices, policy, proximity to infrastructure, and agricultural management across time and space; 3) using results of LCLU change analysis, analyze potential origins and spread of fire while also comparing extreme fire year of 2010 to fires for agricultural management across time and space; 3) analyze statistical model of LULC changes results of LCLU change analysis, analyze fire activity and fire factors to explain the pattern and drivers of anthropogenic fires in post-Soviet areas.

Project Outcomes
1. Landscapes-based LCLU change map for two decades, 1990 - 2000 and 2000 - 2010
3. A statistical model of LULC changes
4. Investigation into the drivers of anthropogenic fire and wildland fire observed in Eastern Europe and Russia
5. Calculation of GHG, air quality, and short-lived climate forcers emissions
6. Outreach with international and in-country collaborators

Remote Sensing and Mapping of Active Fires
- Weekly MCD14ML maps created and assigned land covers for study region;
- MCD45A1 burned area for for all land covers and croplands are mapped;
- Compared to MCD14ML, the MCD45A1 detects different proportions of agricultural burning;
- MCD14ML ag fires for Belarus is 73% of all fires and 56% for Lithuania;
- MCD45A1 ag fires for Belarus is 57% of all fires and 41% for Lithuania;
- Combined 30 m forest cover change product with multiple fire data set to produce stand replacement analysis for Russia, 2002 - 2011 (Figure 4; submitted to EURIS as Krylov et al.)

Abandoned Croplands and Cropland Afforestation
- Between 1985 and 2012, 3.1 million ha of afforestation existed (10% - 12% of abandoned lands);
- No federal policies have been adapted to convert abandoned lands to forest land use.

In-Country Collaborators
Drs. Vladimir Romanenkov (All-Russian Institute for Agrochemistry named after D. Pyryazhnikov [Moscow]) and Dmitry Rukhovitch (V.V. Dokuchaev Soil Institute [Moscow]) and Ms. Polina Koroleva (Dokuchaev Soil Institute) contributed to book chapter on cropland mapping with PI McCarty (Romanenkov et al. 2014). Dr. Maxim Dubinin (NEXTGIS [Moscow]) currently working on web app with NGOs. Fulbright Scholar Alex Gittelson is in St. Petersburg/Moscow and IAMO.

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#fantabulousnasakluckyluck