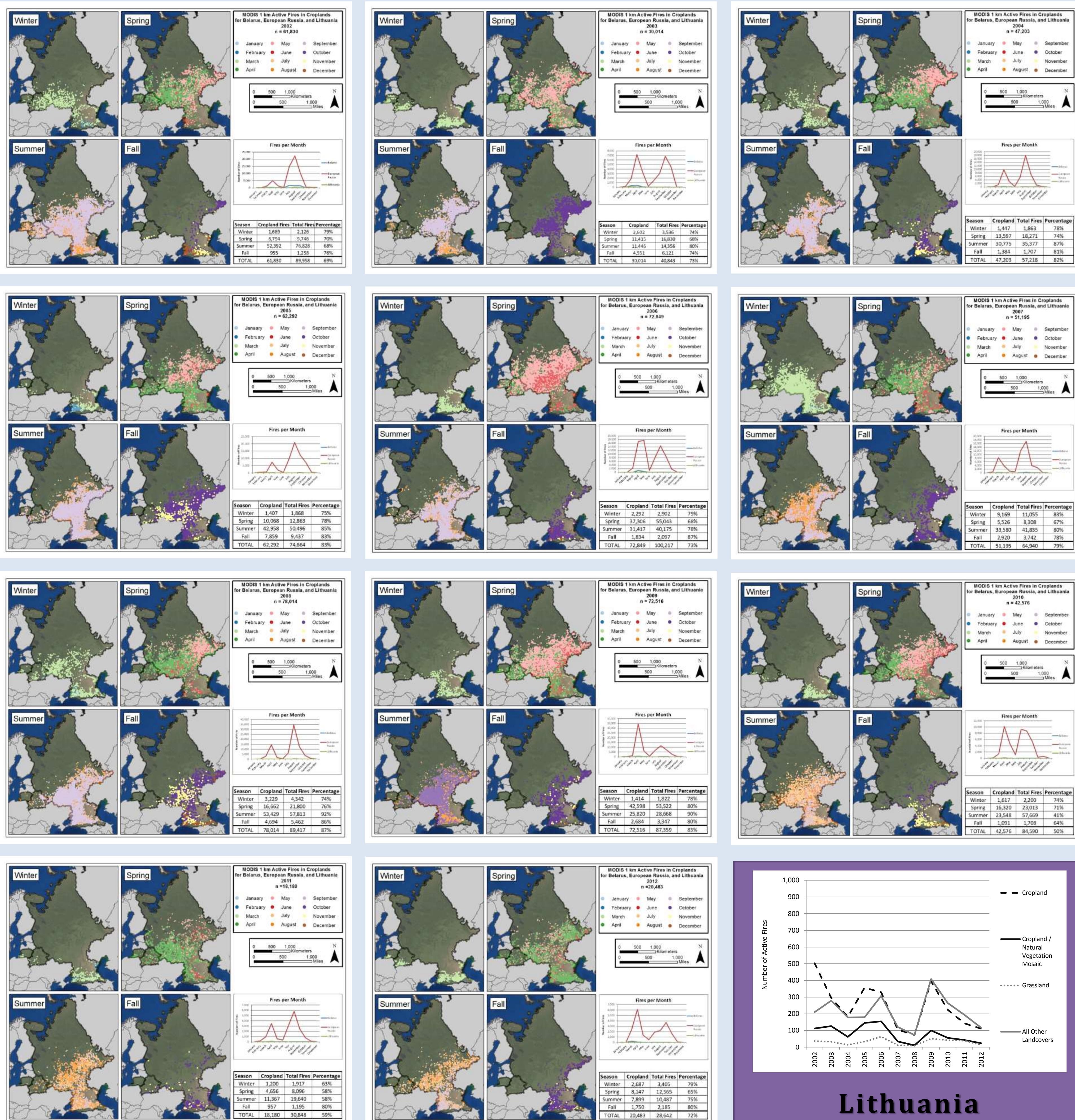
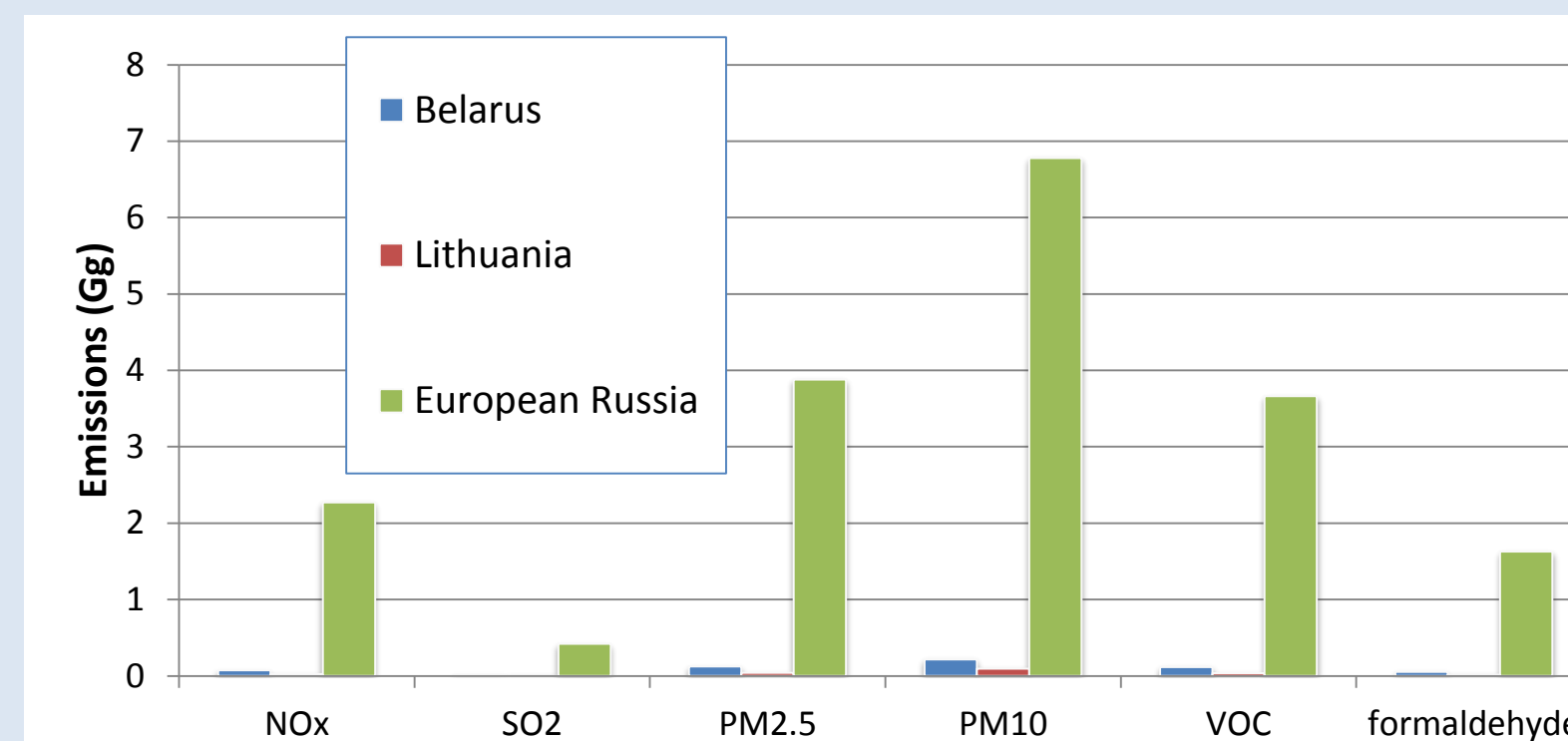


## Global datasets indicate cropland fire.

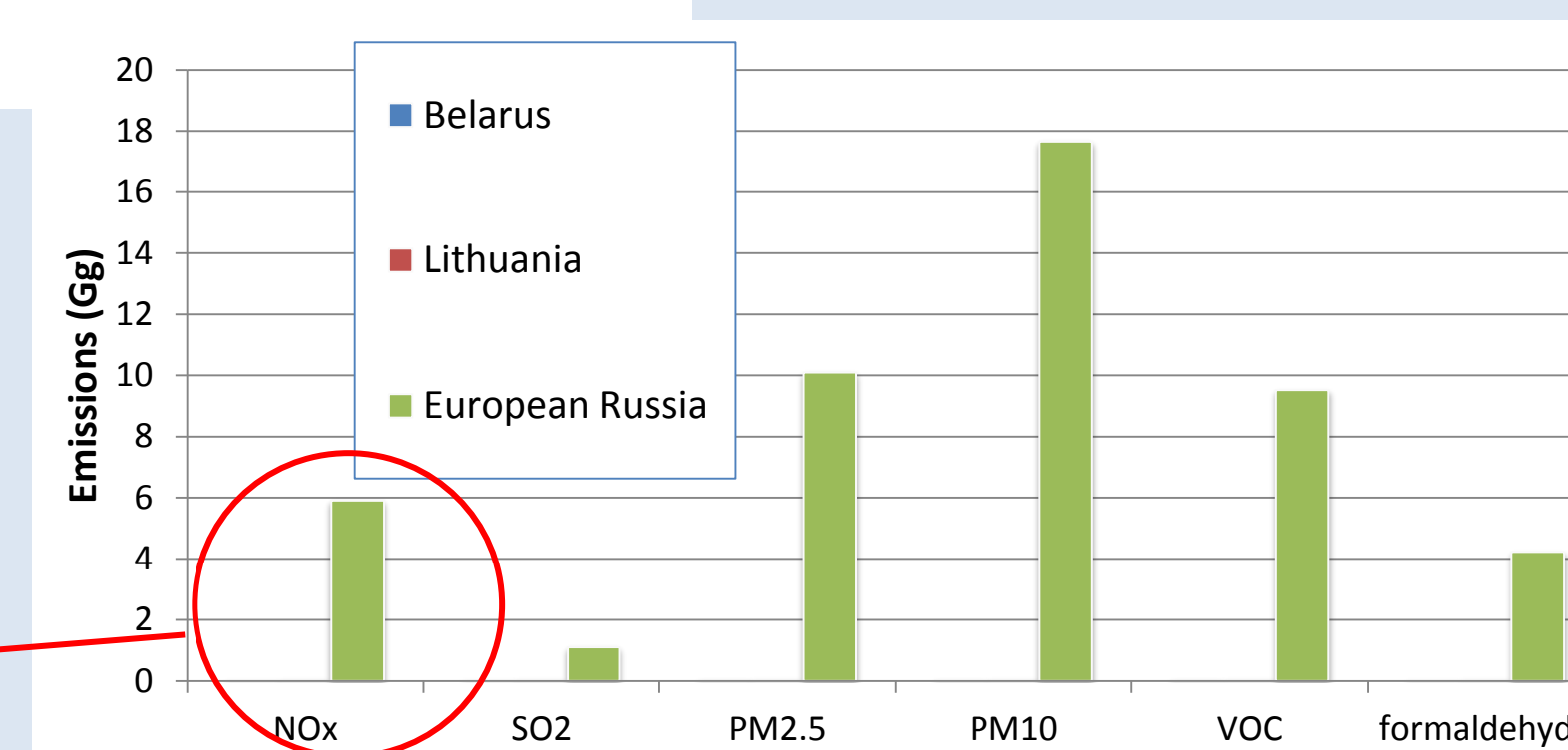


## Russia is main source of cropland fire emissions.



Selected emissions (NO<sub>x</sub>, SO<sub>2</sub>, PM, VOC, and formaldehyde) from cropland burning (LC = 12 in IGBP classification schema) as quantified from 1 km MCD14ML collection 5 MODIS active fire data; all emissions in Gg.

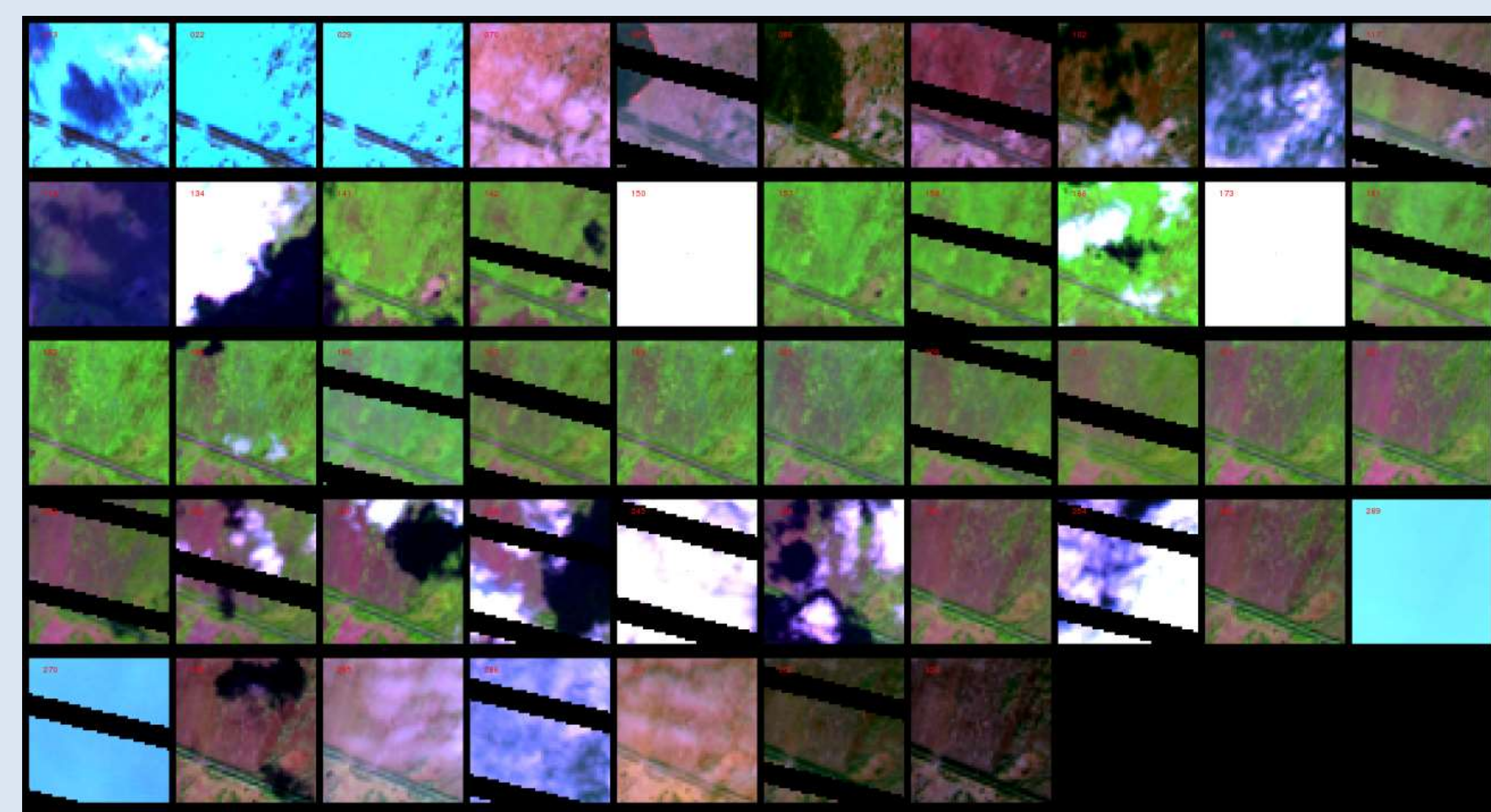
Selected emissions (NO<sub>x</sub>, SO<sub>2</sub>, PM, VOC, and formaldehyde) from cropland burning (LC = 12 in IGBP classification schema) as quantified from 500 m MCD45A1 collection 5.1 MODIS burned area product; all emissions in Gg.



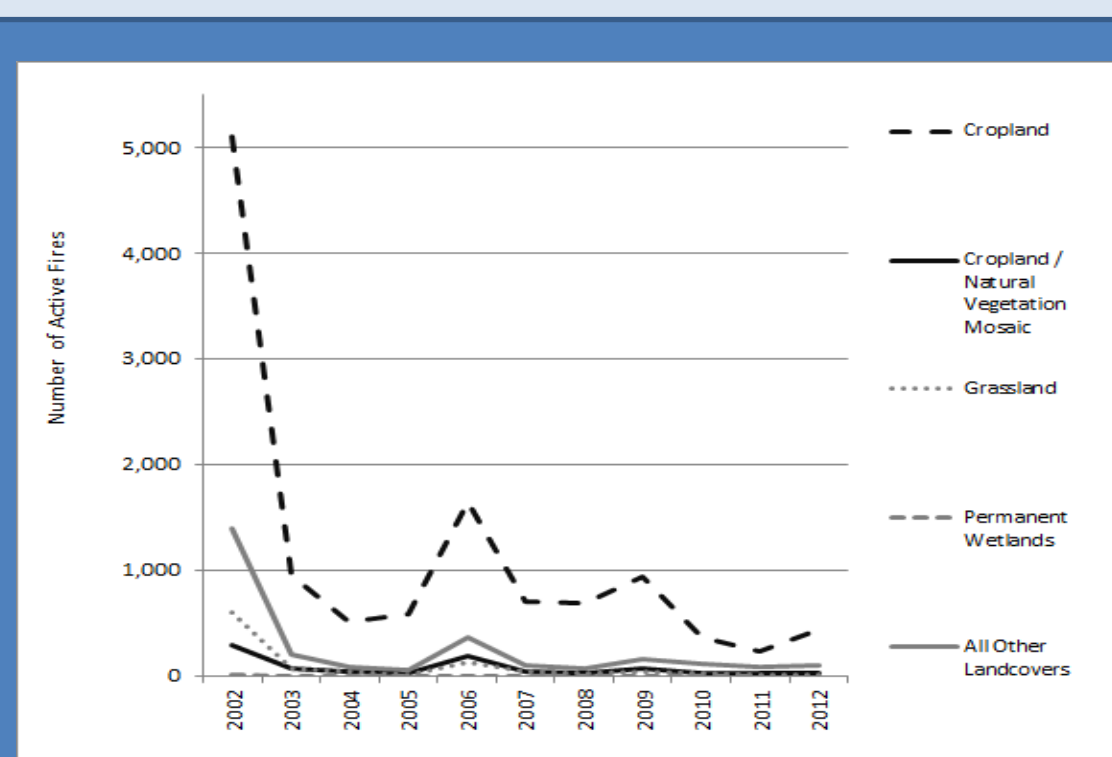
Equivalent to 10% of NO<sub>x</sub> emissions from all sectors in Lithuania (source: European Environment Agency, <http://bit.ly/1CkF72l>)

## But what if much of the fire actually occurs in pastures?

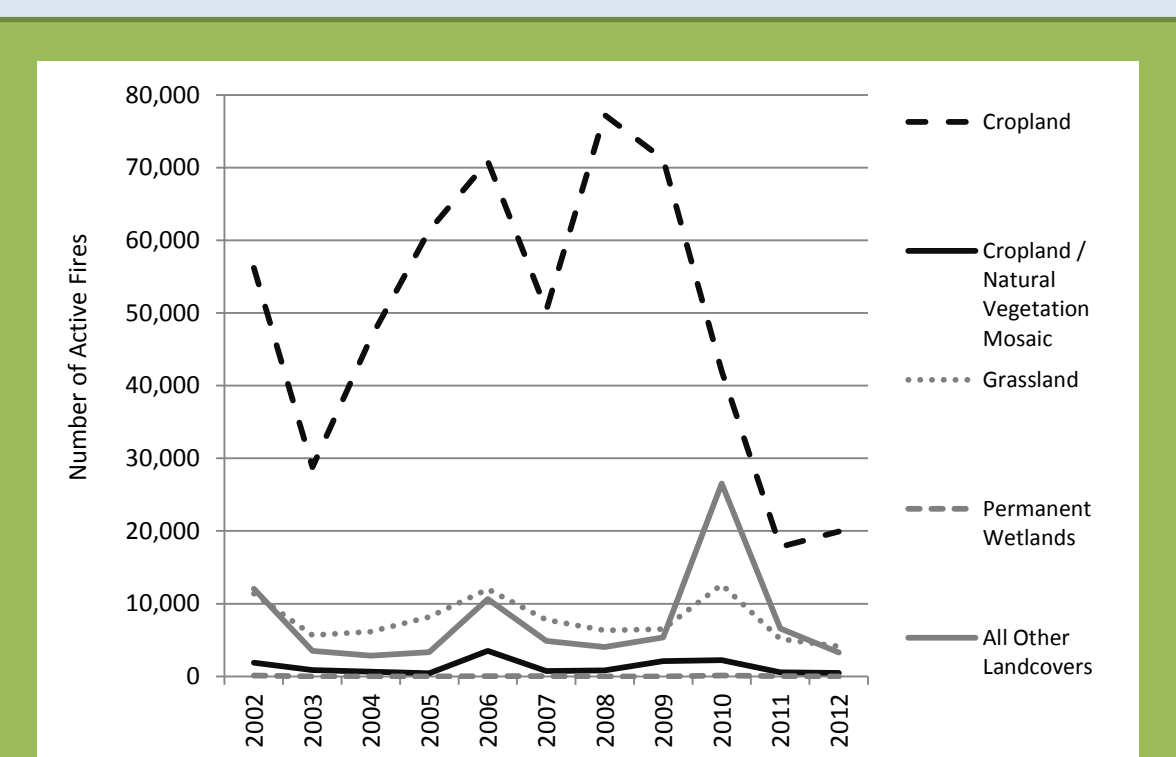
An intensive field campaign was completed in the Smolensk Oblast, Russia in May and June 2014. 500 random sample points were validated for land-cover/land-use type and presence of fire/evidence of recent fire activity. All field-observed burned areas were in pasture areas and not cropland areas. Relating the field-collected and Landsat-derived burned area estimations to MODIS active fire points, we estimate 0.65Mha of pasture was burned in Smolensk in spring 2015 while only 0.06 Mha of pasture was burning in the fall (October and November 2014, meaning fall fire activity is 10 times less than in the spring. Time series of Landsat 7 and Landsat 8 true color images in Smolensk Oblast from 2014013 to 2014326; note that after green-up a distinctive burn scar develops in this mainly pasture landscape.



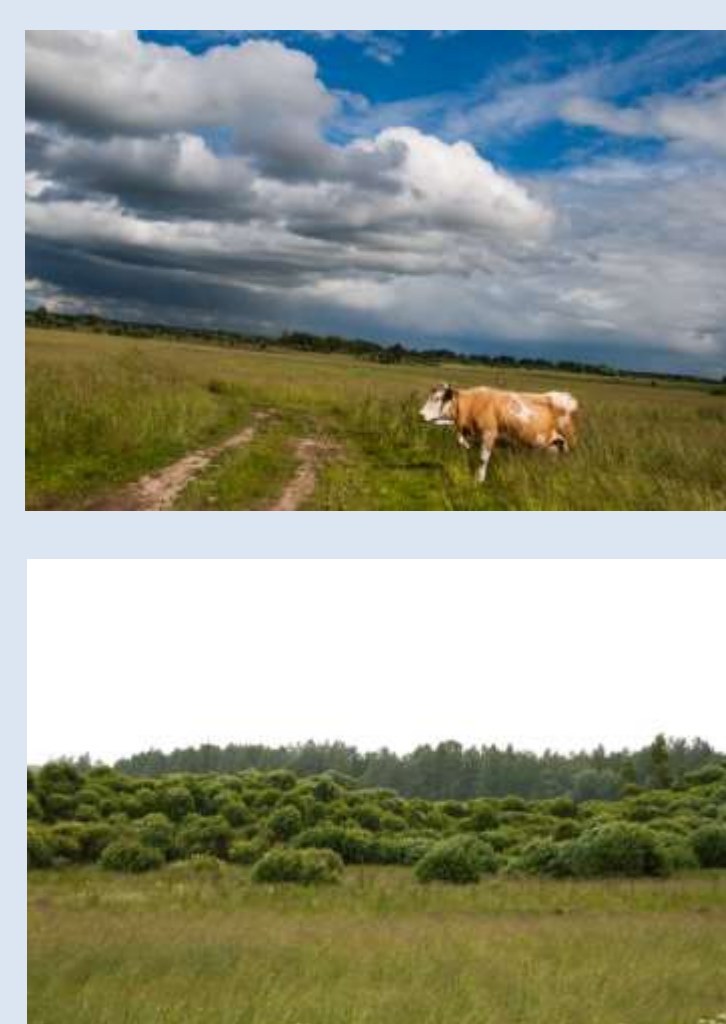
## Lithuania



Belarus



European Russia



Fire Data Source	Burned Area (ha)	CO <sub>2</sub>	CH <sub>4</sub>	CO	NO <sub>x</sub>	SO <sub>2</sub>	PM <sub>2.5</sub>	PM <sub>10</sub>
Spring								
MODIS Active Fire Cropland Burning	22,275	59	0.07	1.95	0.08	0.02	0.14	0.25
MODIS Active Fire	4,950	185	1.04	16.14	0.09	0.04	1.77	3.45
Grassland/Pasture Burning								
Landsat/Field Validated Pasture Burn Scars	169,000	6,318	35.6	550.98	3.06	1.31	60.4	117.95
Fall								
MODIS Active Fire Cropland Burning	1,825	4.84	0.01	0.16	0.01	1.27E-03	0.01	0.02
MODIS Active Fire	325	12.15	0.07	1.06	0.01	2.51E-03	0.12	0.23
Grassland/Pasture Burning								
Landsat/Field Validated Pasture Burn Scars	1,440	53.83	0.30	4.69	0.03	0.01	0.51	1.01

## Acknowledgements

This work is funded by NASA LCLUC Award under NASA Contract # NNX13AC66GG.