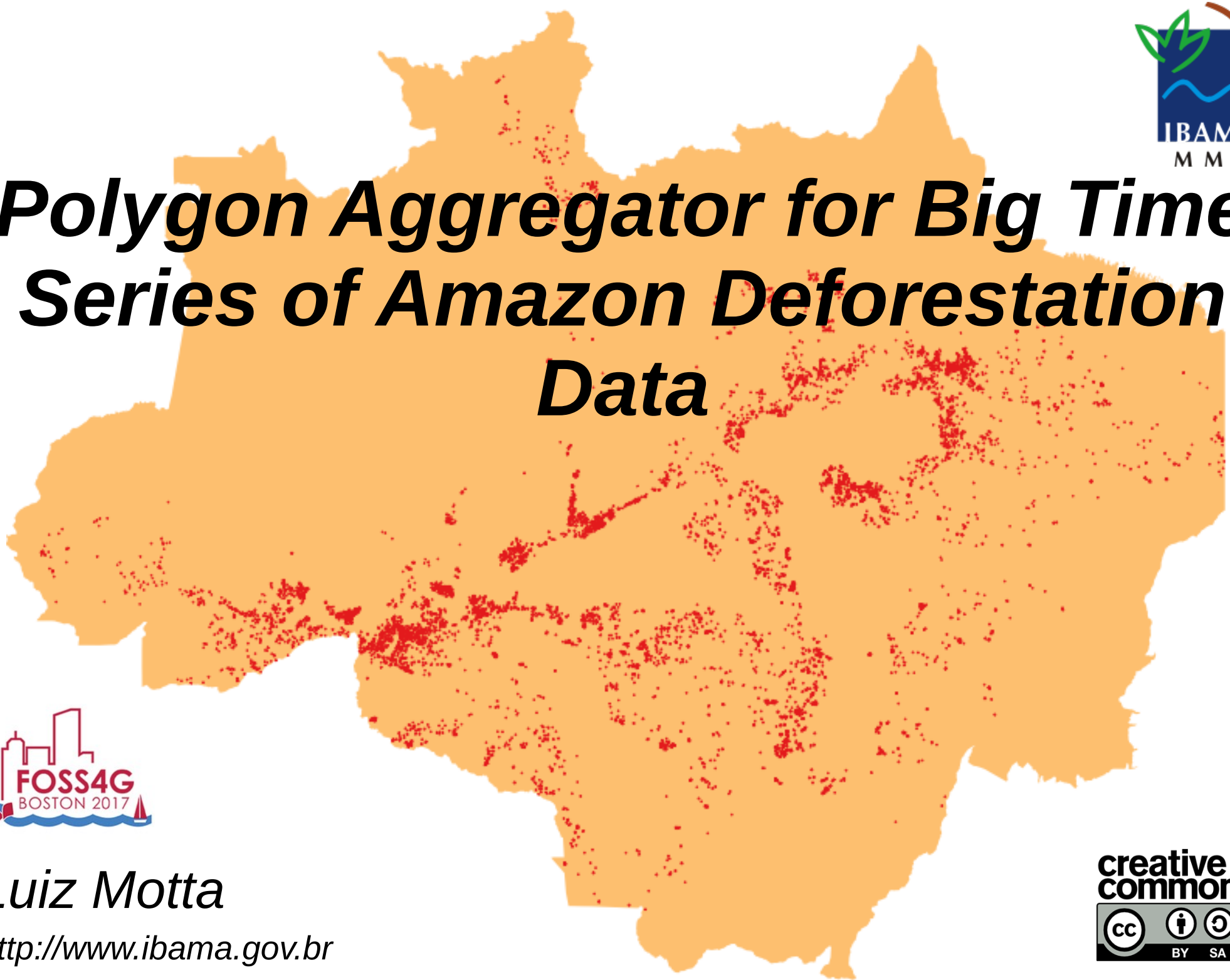
Polygon Aggregator for Big Time Series of Amazon Deforestation Data



Luiz Motta

http://www.ibama.gov.br

MMA - Ministry of the Environment

IBAMA - Brazilian Institute of Environment and Renewable Natural Resources

*CENIMA – National Environmental Monitoring and Informations Center **

Luiz Motta:
- Environmental Analyst of IBAMA(since 2003).
- Collaborate to FOSS4G(since 2010)
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Goal: Combat for Deforestation of Amazon

Presentation plan

- Amazon's deforestation data from satellite images and use of polygon aggregator.
- The implementation of polygon aggregator.
- Example of combating deforestation (IBAMA's operation).
- Polygon aggregator improvements.

Amazon's deforestation data from satellite images and use of polygon aggregator.

- DETER-B

  INPE - National Institute for Space Research

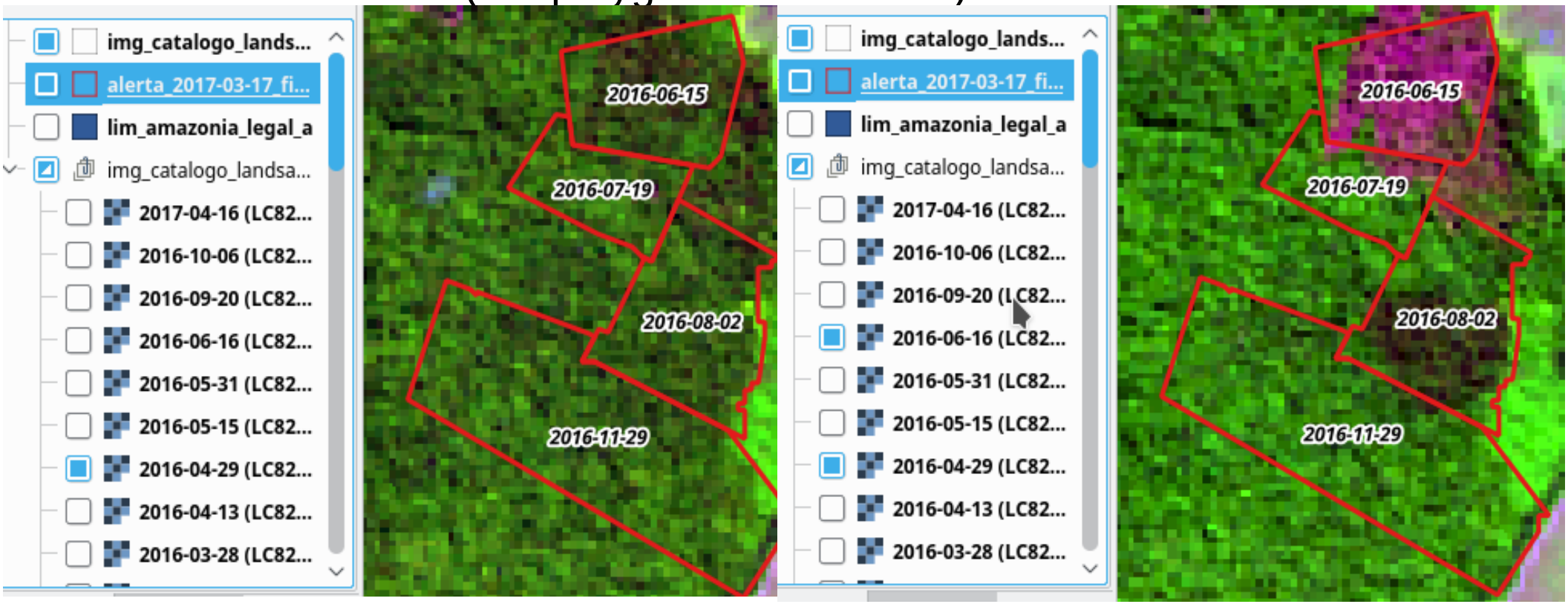
  http://www.inpe.br/cra/projetos_pesquisas/deterb.php

  Images | Source | Spatial Res.(m) | Temp. Res(days)

  AwiFS | Indian Remote Sensing | 56 | 5

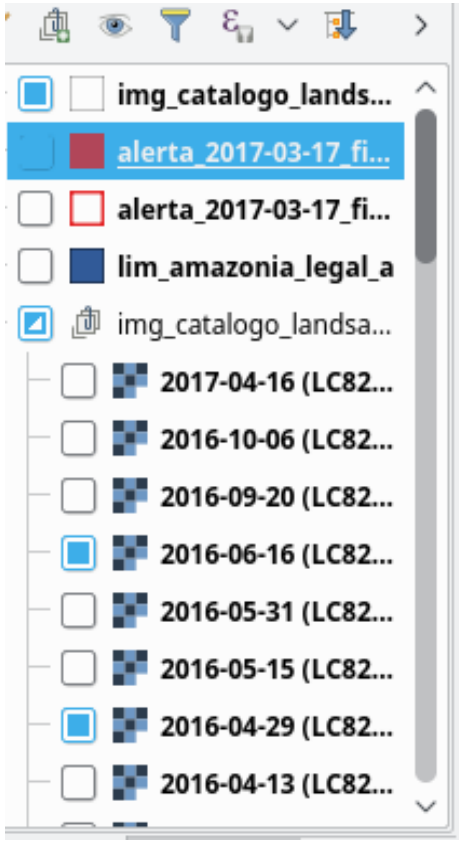
  WFI | INPE & CAST | 60 | 5

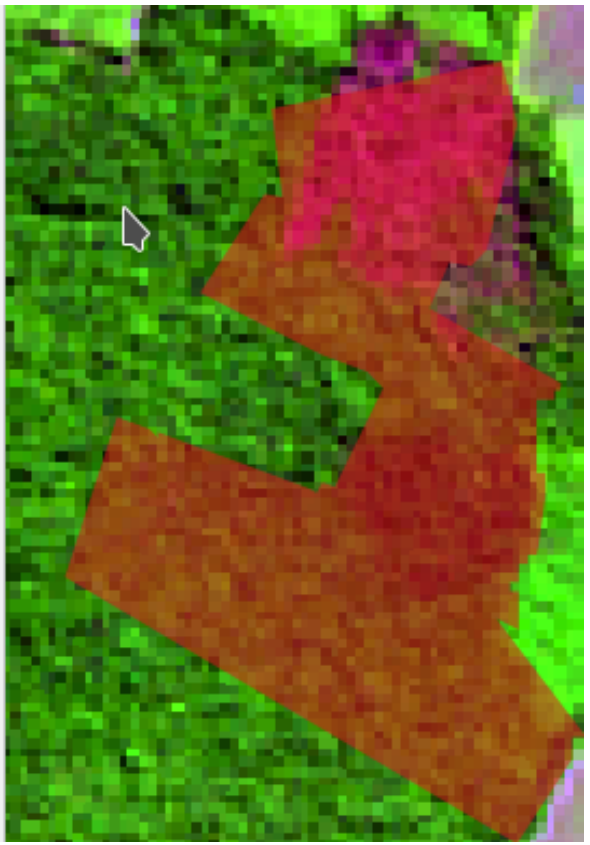
  * Demand of IBAMA (the polygons are receive) – Vector Product



Amazon's deforestation data from satellite images and use of polygon aggregator.

- DETER-B





id_group	224
(Derivado)	
(Ações)	
id_group	224
n_events	4
ini_date	2016/06/15
end_date	2016/11/29
ini_ha	40.449845458889008
end_ha	217.631332317705443
n_fids	4
fids	725;4544;4933;8170
dates_ev	2016/06/15;2016/07/19;2016/08/02;2016/11/29
ha_ev	40.449845;25.626855;48.784072;102.770560

Features: 8.348 (original) → 899(aggregator) ~ 11%

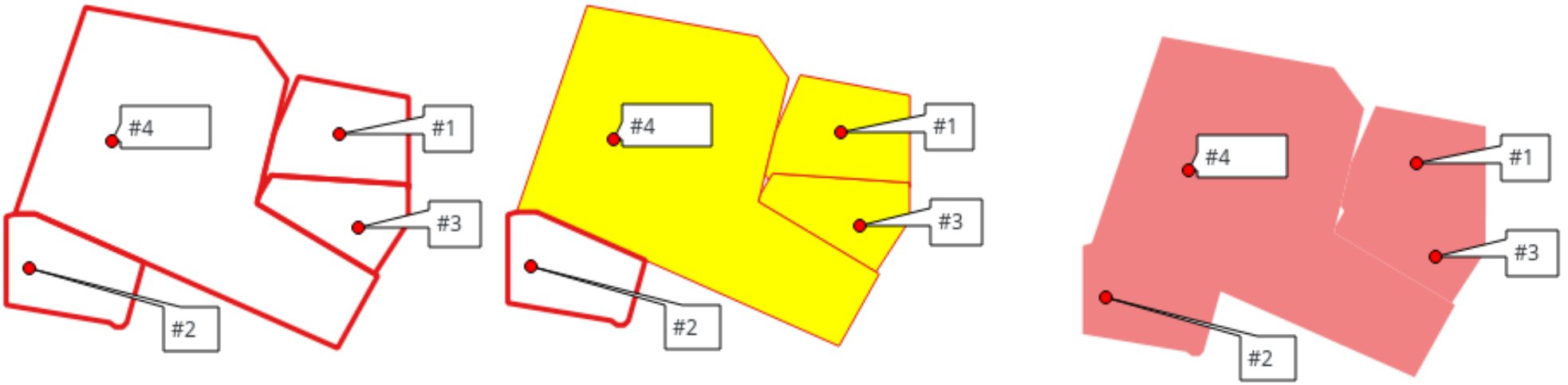
https://github.com/lmotta/scripts-for-gis/blob/master/union_neighbour_deter.py

The implementation of polygon aggregator.

- Test each geometry: Spatial filter and use ***Touches***

- Removes polygons without neighbors

- Create a layer in which each geometry accumulate yours neighbors.
  - Fetch a geometry and compare with others geometries. If geometry touche other geometry -> Aggregate*
  - With aggregate polygon compare with others geometries. If aggregate polygon touche other geometry -> Aggregate*

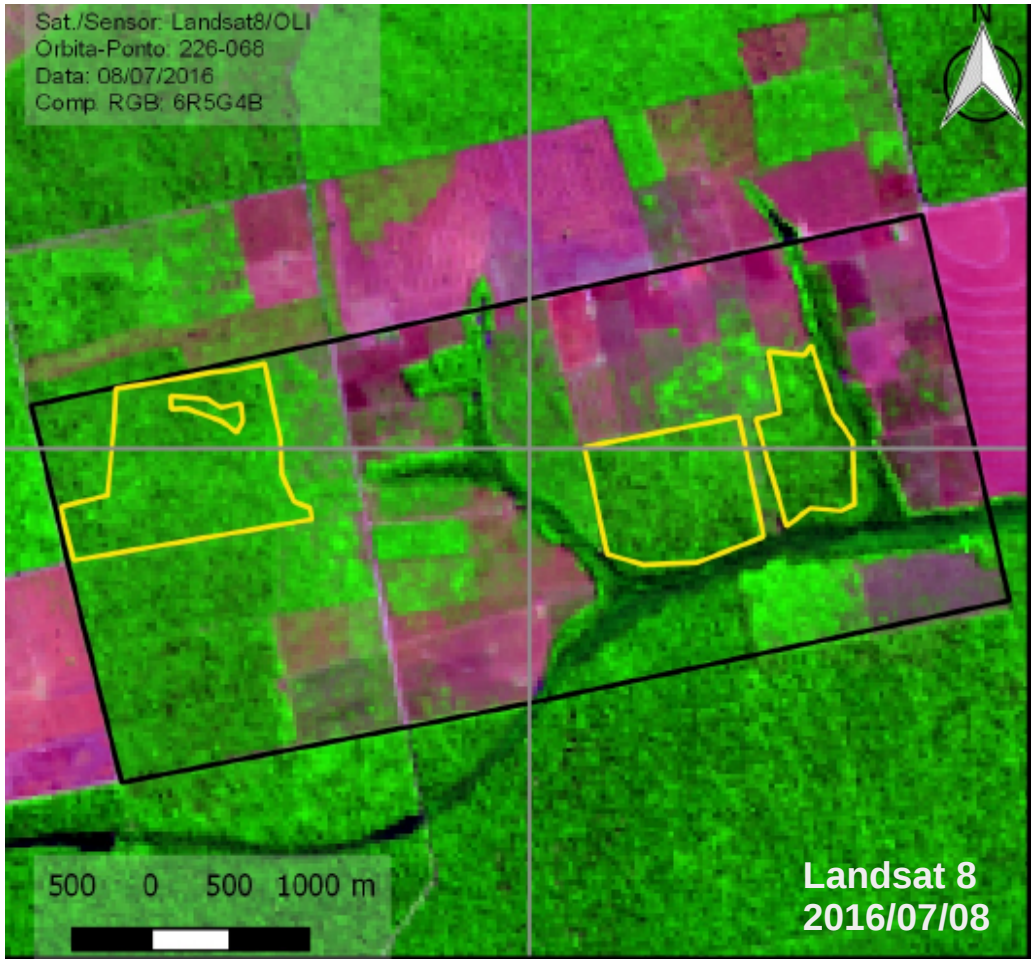


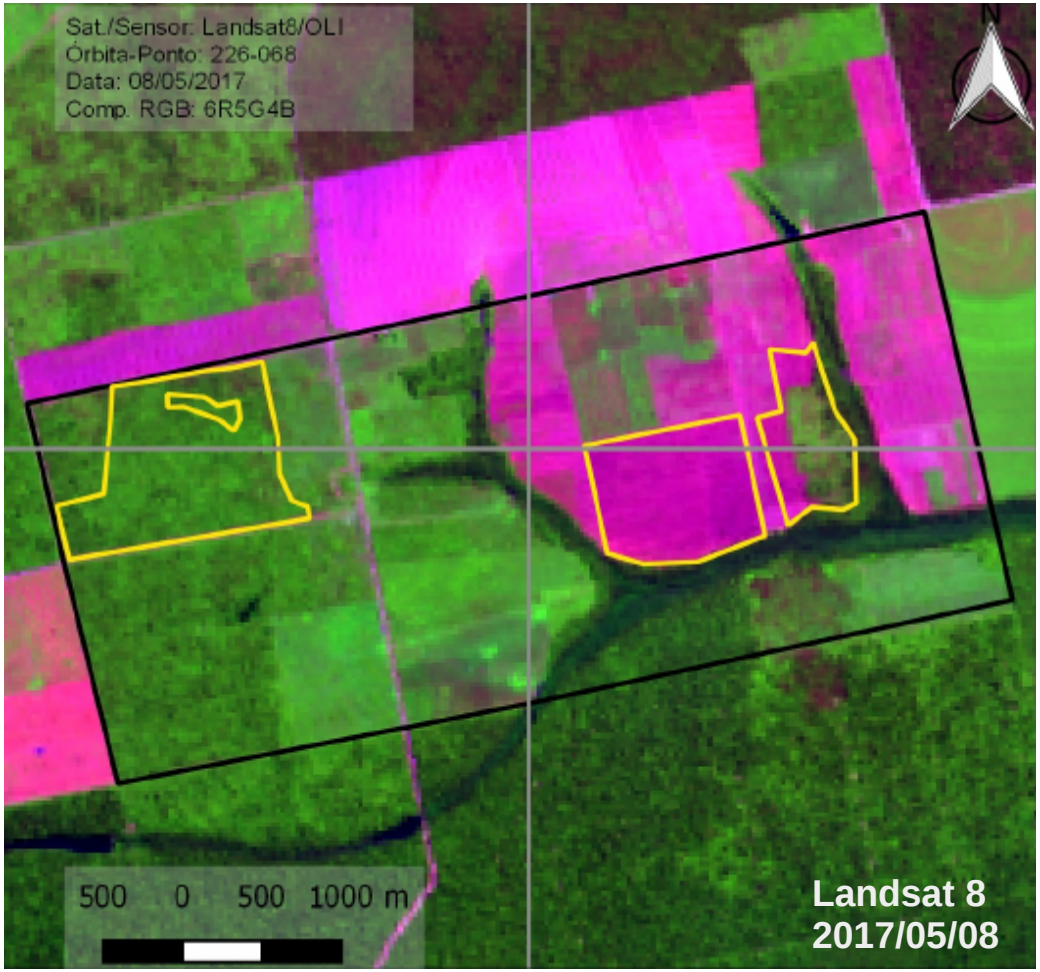
Aggregate: dissolve boundary(union) and add event(date and area)

Example of combating deforestation (IBAMA's operation)

- Real case of a combat operation of deforestation, where used the satellite images for its detection.
- The work was made by environmental analysts of Sinop-MT office.
- This work show the potential of use the polygon aggregator.

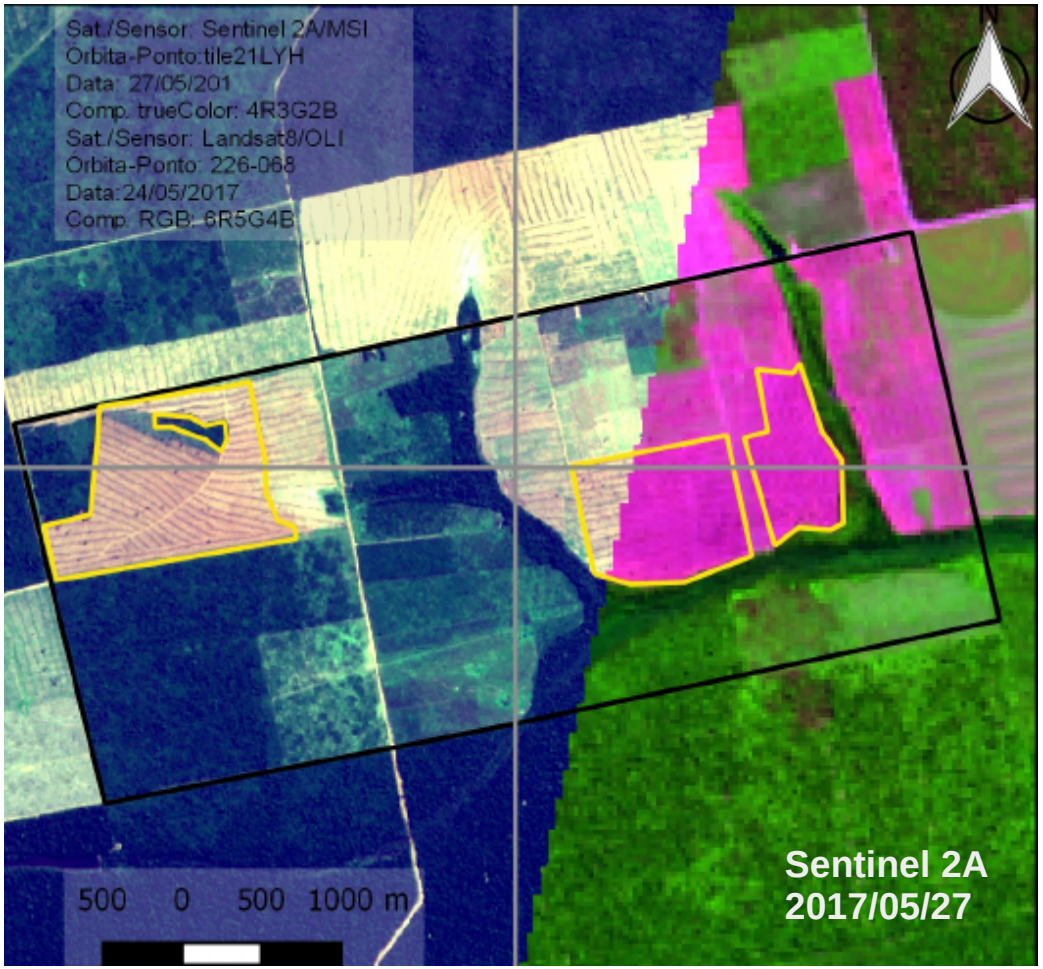
Example of combating deforestation (IBAMA's operation)





Polygons created starting at 2016/07/08 and finished at 2017/05/27

Example of combating deforestation (IBAMA's operation)



Polygons created starting on 2016/07/08 and finished on 2017/05/27

IBAMA operation was on 2017/05/27

Example of combating deforestation (IBAMA's operation)

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Example of combating deforestation (IBAMA's operation)

Free user of Planet Explorer – Test-only use

Example of combating deforestation (IBAMA's operation)

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IBAMA operation was on 2017/05/27

Example of combating deforestation (IBAMA's operation)

Free user of Planet Explorer – Test-only use

Polygon aggregator improvements.

- Get shorter time series of images(better temporal resolution).
- Automatic process for detection of deforestation and generate polygons.
- Make use parallel processors and improve calculation to find neighbors.
- Generate the aggregate polygons in the same place of images.
- Create the profile of deforestation action for alerts.

Acknowledgment

- FOSS4G Boston 2017 Program Committee that accepted my presentation.
- IBAMA that allowed me to participate in this event.
- Brazilian Forest Service that helped with my trip.
- For all people and companies that make FOSS4G a reality. “Together, we make more with less”.