Background

- The dynamic of open fire phenomena makes remote sensing a good tool for both fire detection and burn area assessment.
- A multi-temporal approach relies on pre and post fire images to derive vegetation maps (e.g. Normalized Difference Vegetation Index - NDVI).
- While Mediterranean countries have a high likelihood of cloud free satellite data in VIS-SWIR, the north European countries are more challenged and SAR data may be used.
- We show preliminary results obtained in two case studies:
  - Case study 1: Santa Marinella wildfire - 20 July 2017 - in Latium Italy
  - Case study 2: Stalybridge wildfire - 10th April 2016 - in The Peak District National Park

Methods

NDVI index is used to measure healthy, green vegetation in remote sensing data. The differential version of NDVI, named dNDVI, is commonly used in assessment of vegetation change, if defined as:

$$\text{dNDVI} = \text{NDVI}_{\text{post}} - \text{NDVI}_{\text{pre}}$$

Pixels affected by fire usually show a low-separation effect, such pixel shows high positive dNDVI values.

Conventional approach:

1. **Pre-fire Image**: Map of burned area pixels (red) and not burned area pixels (green).
2. **Post-fire Image**: Map of burned area pixels (red) and not burned area pixels (green).
3. **Difference Image**: Map of burned area pixels (red) and not burned area pixels (green).

Proposed alternative approach:

1. **Pre-fire Image**: Map of burned area pixels (red) and not burned area pixels (green).
2. **Post-fire Image**: Map of burned area pixels (red) and not burned area pixels (green).
3. **Difference Image**: Map of burned area pixels (red) and not burned area pixels (green).

**Results**

- **Case Study 1**: Conventional approach
  - dNDVI values histograms show relatively good separability.
  - Adaptive thresholding to be used.
  - Phenology impact on Sentinel-2A data and need further investigation.

- **Case Study 2**: Proposed alternative approach
  - dNDVI values histograms show relatively good separability.
  - Adaptive thresholding to be used.
  - Phenology impact on Sentinel-2A data and need further investigation.

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**References**