



EO for Africa Symposium 2024

23 - 26 September 2024

ESA | ESRIN, Frascati (IT)

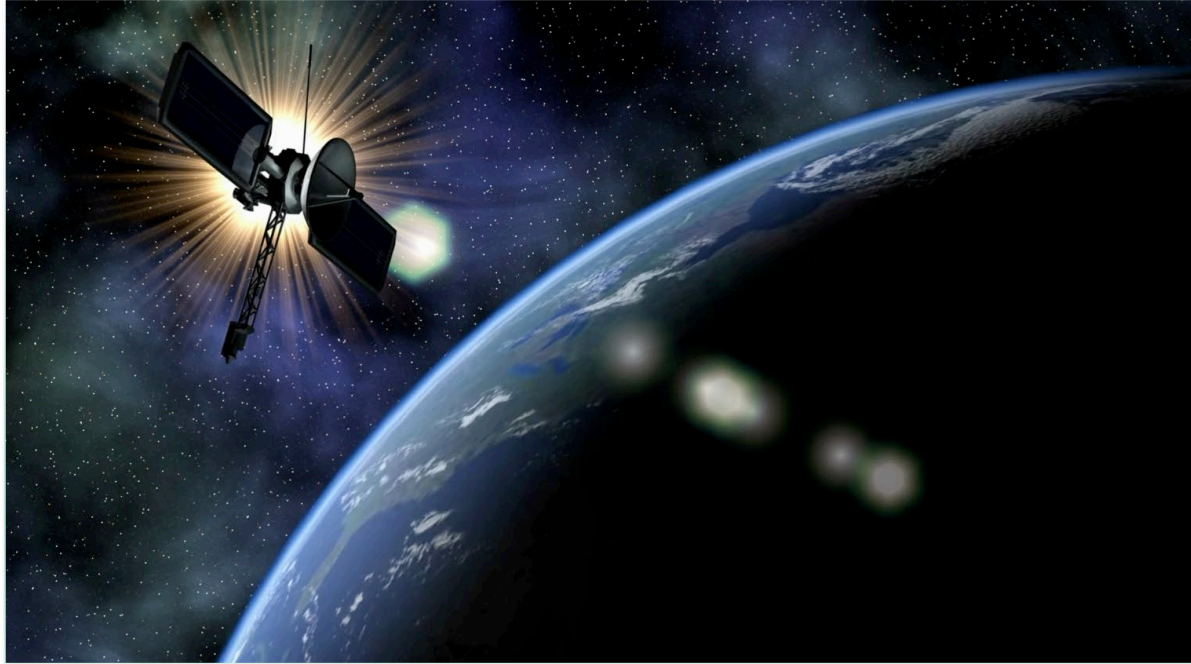
PEACEEYE: Harnessing EO & Human Intelligence for Climate Resilience & Conflict Resolution in Africa

Presented by

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Source: vecteezy.com



Source: Canva

“Do you think a collaboration between Earth observation and local communities can foster peace in Africa?”



PeaceEye

Conflict mapping & understanding

VISION

'a state-of-the-art technology-conflict-interface to analyze, understand and respond better to security challenges in volatile contexts and insecure environment around the globe'





Problem we aim to solve

Data sources to be explored

Solution Framework

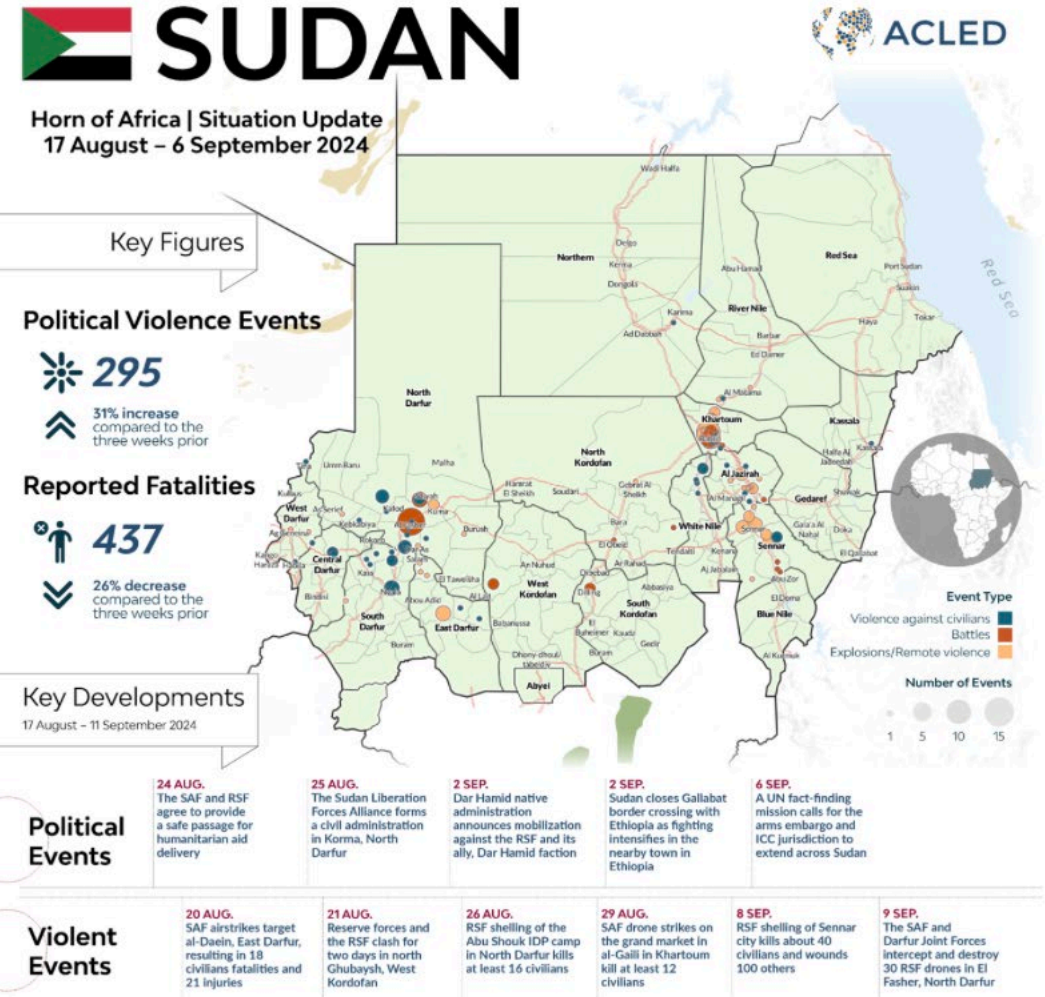
Pilot case

Challenges & Conclusion

Problem



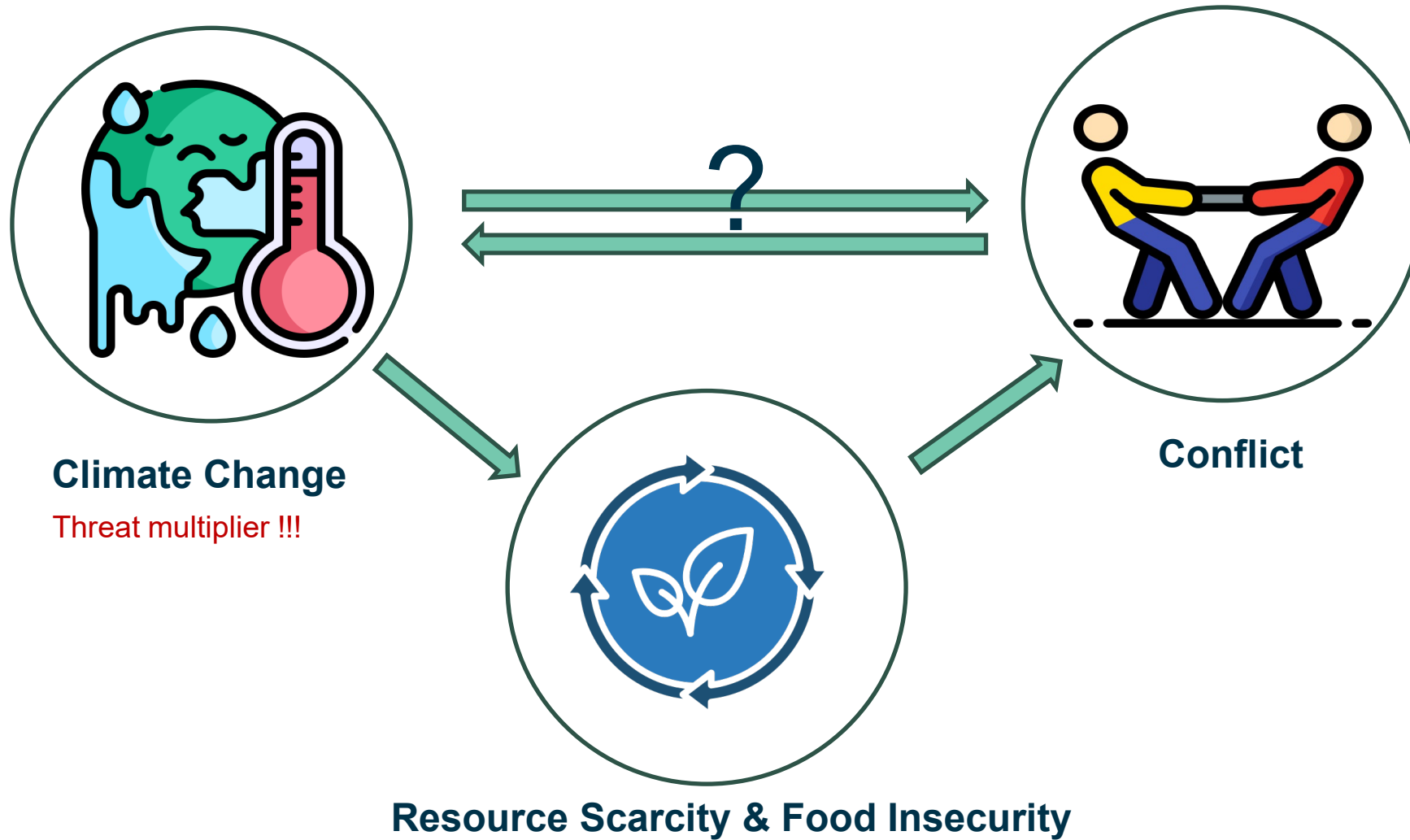
Conflict



Global Conflict statistics by ACLED

- 22% rise in global political conflicts in the past 5 years
- 57% projected increase in global political violence
- 340+ million people projected to require aid in 2023
- 167k million people projected to require aid in 2023
- 147k violent conflict events in 2023
- 1 in 6 individuals currently living in affected region

Source: acleddata.com





EU Science Hub

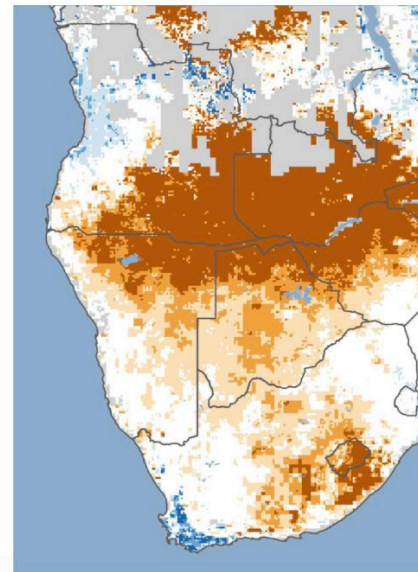
[Home](#) > [JRC news and updates](#) >

Severe drought worsening humanitarian and environmental crisis in Southern Africa, new European Commission report shows

NEWS ANNOUNCEMENT | 19 April 2024 | Joint Research Centre | 2 min read

Severe drought worsening humanitarian and environmental crisis in Southern Africa, new European Commission report shows

Southern Africa is currently facing an extreme environmental and humanitarian crisis as a severe drought takes a stronger hold on the region. Zimbabwe, Zambia, and Malawi have officially declared states of emergency.



Worsening drought triggers state of emergency across Southern Africa
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Worsening hunger grips West and Central Africa amid persistent conflict and economic turmoil

12 April 2024

Worsening hunger grips West and Central Africa amid persistent conflict and economic turmoil

DAKAR – Nearly 55 million people in West and Central Africa will struggle to feed themselves in the June-August 2024 lean season, according to the March 2024 Cadre Harmonisé food security analysis released by the Permanent Inter-State Committee for Drought Control in the Sahel (CILSS).

This figure represents a four-million increase in the number of people who are food-insecure compared to the November 2023 forecast and highlights a fourfold increase over the last five years. The situation is particularly

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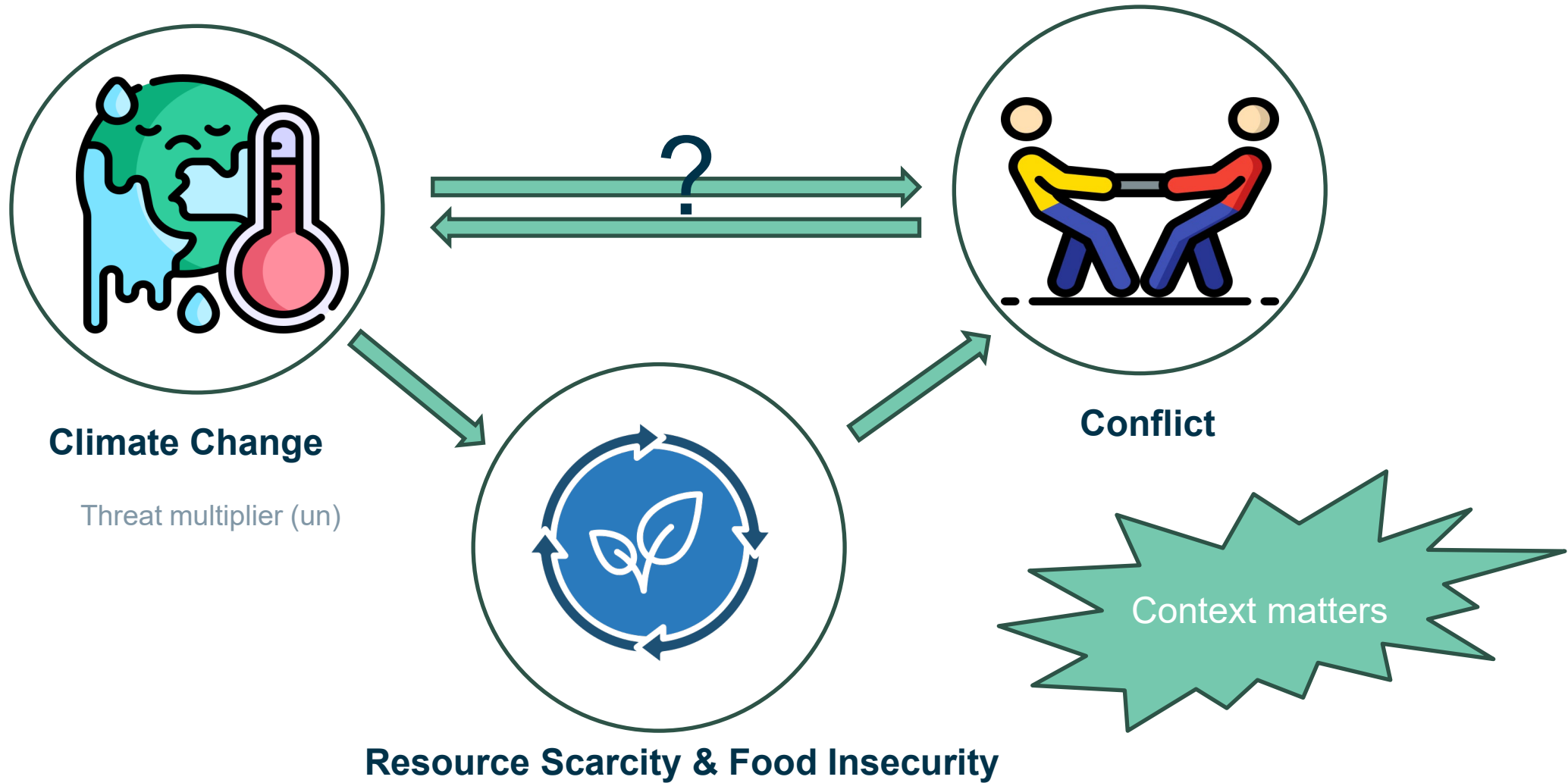
Source: www.wfp.org/

Source: www.joint-research-centre.ec.europa.eu/

**"Climate resilience:
A key to conflict
prevention"**

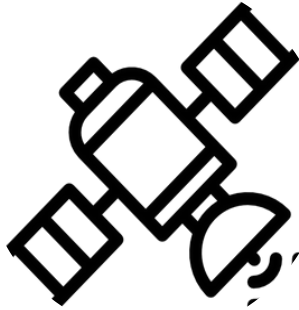
How?

- Infrastructural Adaptation
- Ecosystem preservation
- Diversification
- **Early warning systems**





**Earth observation
&
Geospatial Data**



**Local human
intelligence
(HUMINT)**



**Expert Knowledge
and credible Open-
source data
(OSINT)**



**Geo -Social
Media (GEOMINT)**





Environmental Impact

Objectives

- Develop and further improve methods to monitor and assess the impact of refugee/IDP camps on the environment
- Evaluate the implications of environmental change on human well-being (i.e., food and livelihood security) and ecological integrity (i.e., state of ecosystems)
- Derive the **Weighted Natural Resource Depletion (NRDw) Index** based on land use/land cover (change) mapping and outcomes of an expert-based survey

3-stage approach

1

2

3

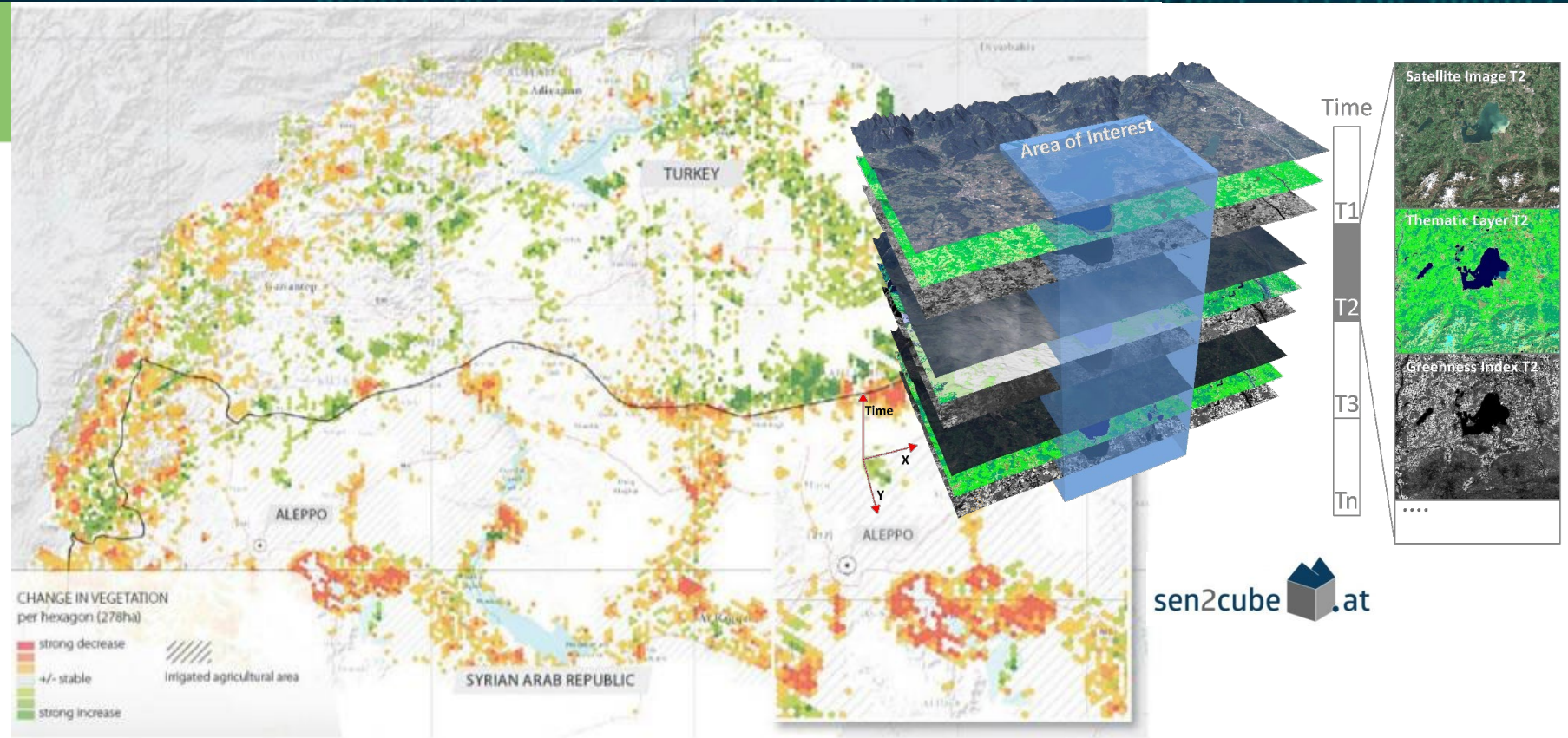
1: Automated monitoring of land cover (vegetation/non-vegetation)

2: Object-based monitoring of relevant land use classes (e.g. agriculture, forest)

3: Evaluation of land use/land cover changes

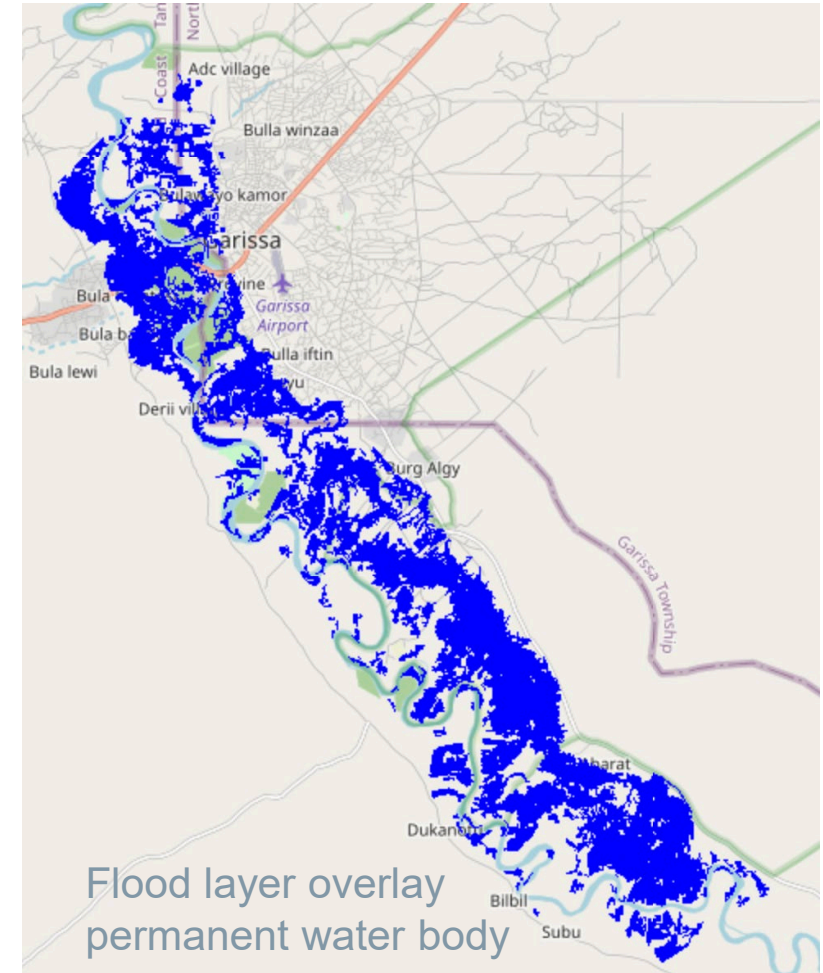
Data

- SAR data and derived products
- Multi-temporal VHR and HR EO data

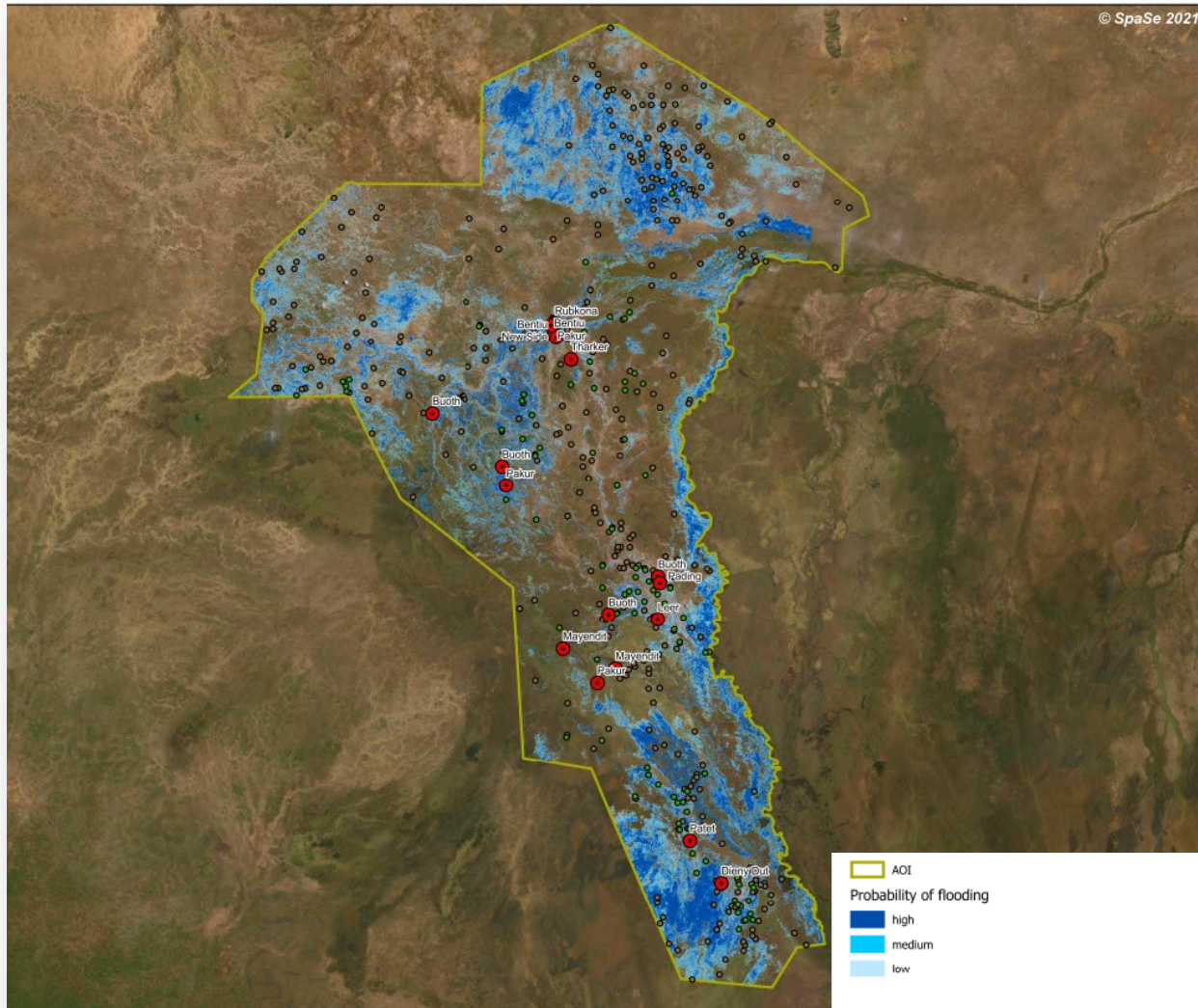


Environmental Analysis using semantic satellite data cube to detect land use changes





Tana River, Kenya (May 2024) Flood Extent Mapping



Flooding in South Sudan, October 2021

Population Estimation

Objectives

- Develop an automated, robust and transferable approach for **dwelling extraction**
- Provide **realistic population figures**
- Derive **added-value** information based on the spatial distribution of dwellings
- Monitor **camp evolution**
- Analyze **diverse types of refugee settlements** and elaborate a comprehensive **semantic description**

1 Object-based dwelling extraction



2 Added value products

- Dwelling density
- Camp structure
- Camp outline
- Camp evolution



Data

- (Multi-temporal) very high resolution (VHR) satellite data



UAV Image: IOM Refugee Camp Kutupalong, (2017)

Population monitoring, Refugee camps, damage assessment



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Channel details

Created on Jan 17, 2024

conflict # water # food

Demo project for PeaceEye

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PeaceEye - Abyei Demo

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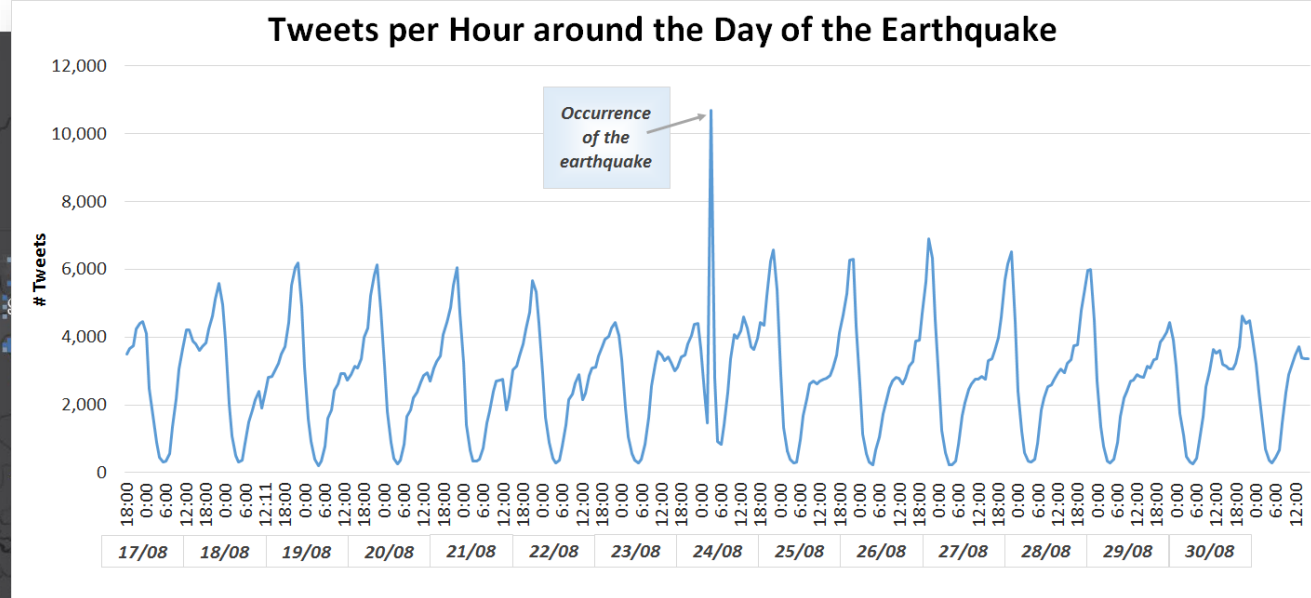
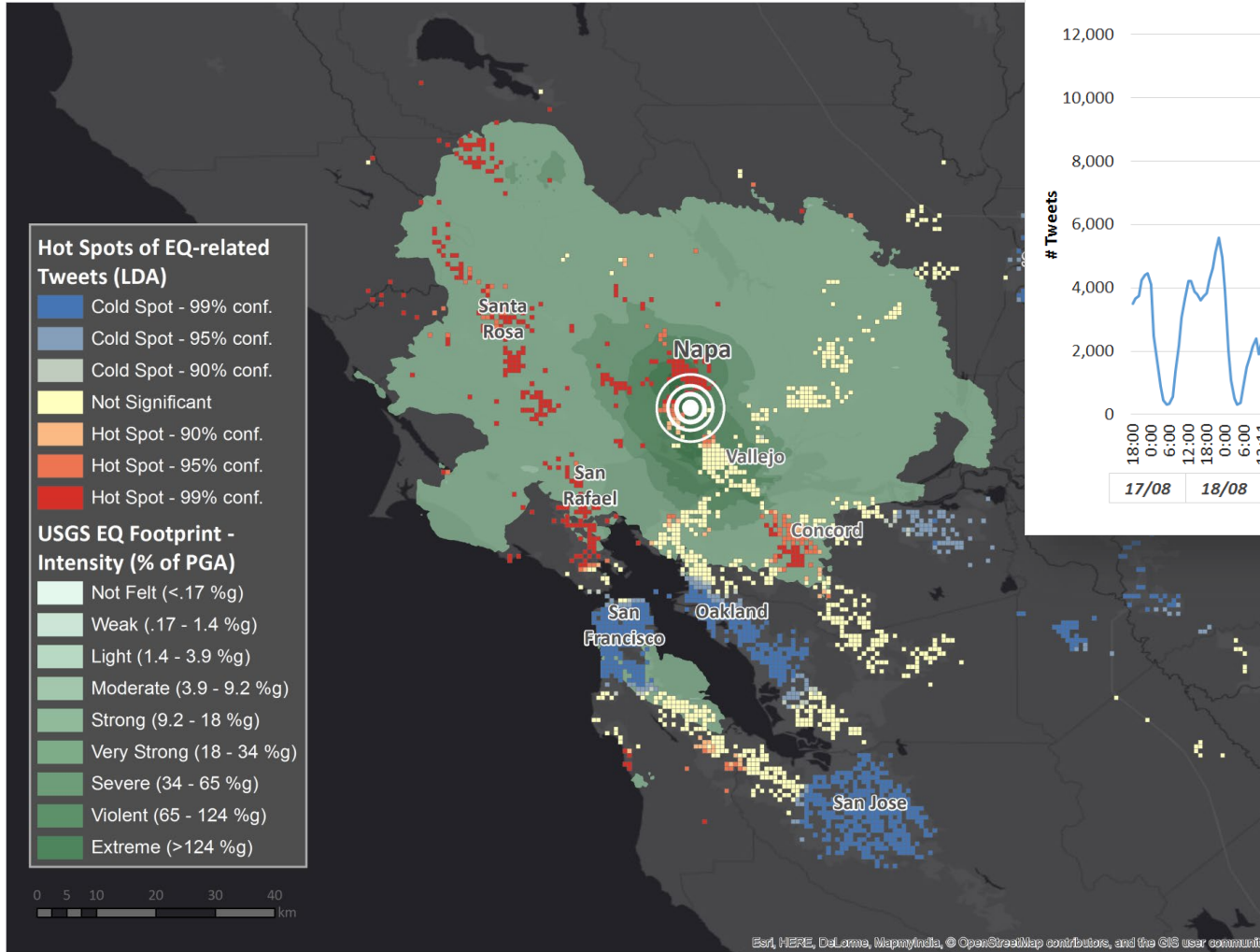
ISSUE SURVEY NOTIFICATION

Pinned posts by moderators

Find posts

FILTER

Integration of local knowledge (potential conflict parties / uprising, socio-economic developments and local political situations) through an exchange platform – Geocitizen app



Sentiment Analysis

Multi-dimensional analysis of collected geo-social media data to get the 'feel' of the people before and during an event

Urban Emotion Mapping Using Tweets

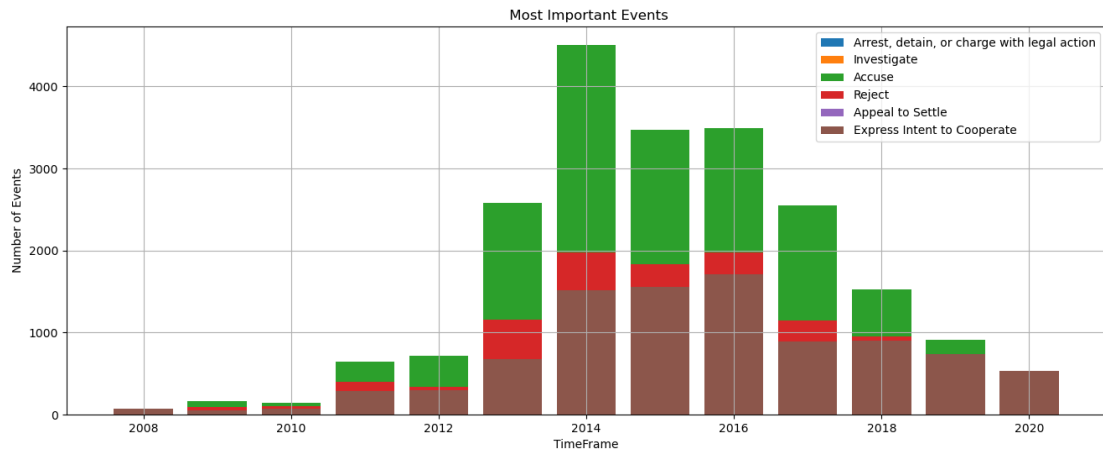
Resch et al. 2017



Horizon 2020
European Union funding
for Research & Innovation

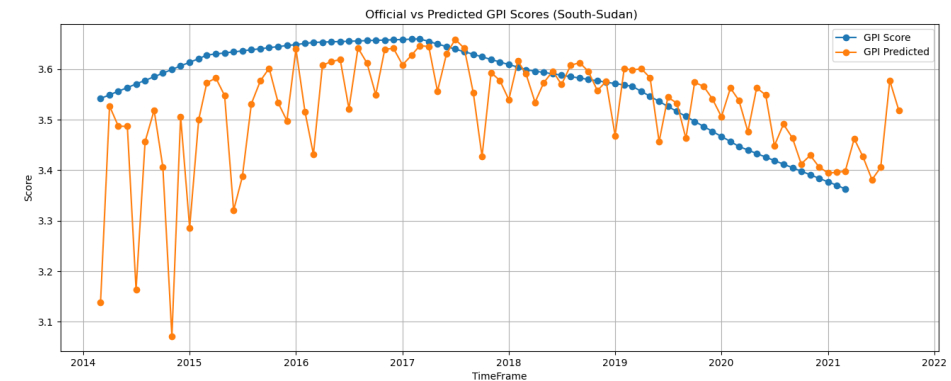
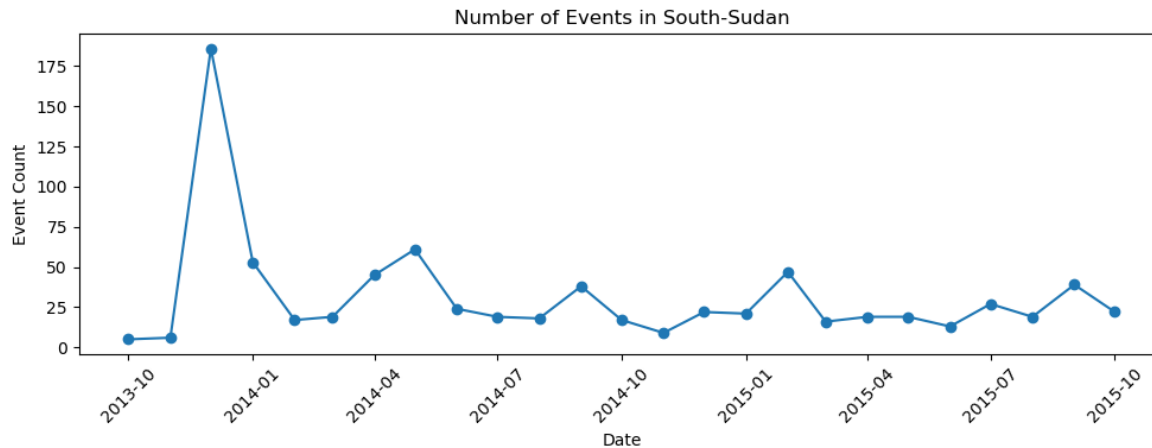
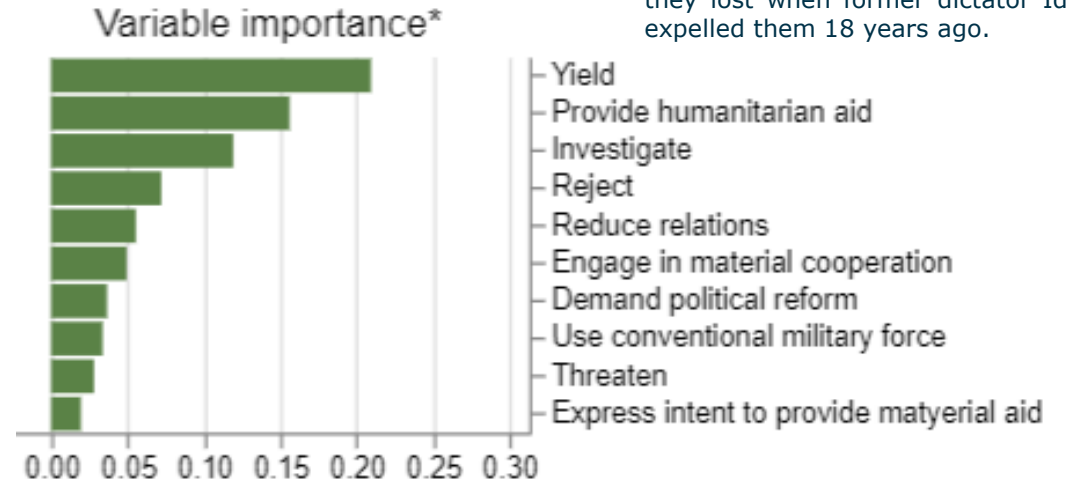


Georeferenced Reports – GDELT & GPI SCORES Prediction



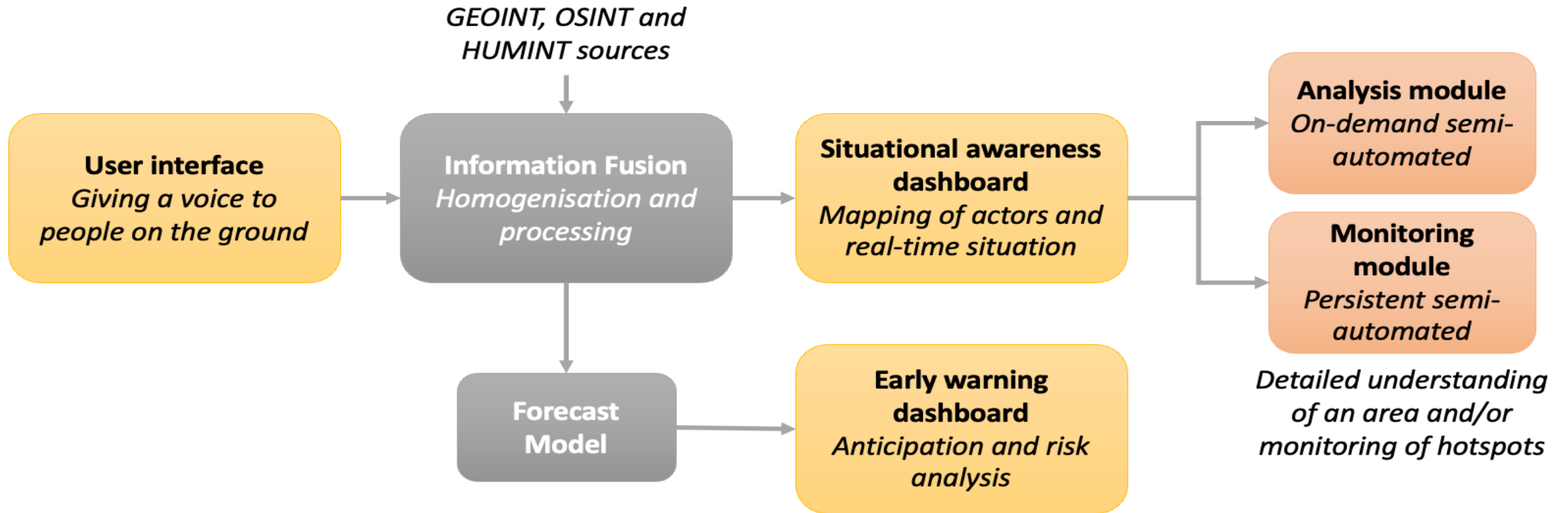
South - Sudan

*Yield (CAMEO Code - 80): All yieldings, concessions not otherwise specified. E.g. : Uganda said on Sunday it had paid compensation to 67 elderly British nationals, most of the Asians, for assets they lost when former dictator Idi Amin expelled them 18 years ago.



<https://ecspire.esa.int/gaia/accidents/02000000>





Conflict Early-warning

- Regular outbreaks of armed violence among different tribes
- Access to local knowledge / human intelligence – NGO's and peace activists
- Satellite-based population monitoring camps
- Harvest monitoring based on satellite imagery (e.g. Copernicus Sentinel)
- Analysis of stress indicators

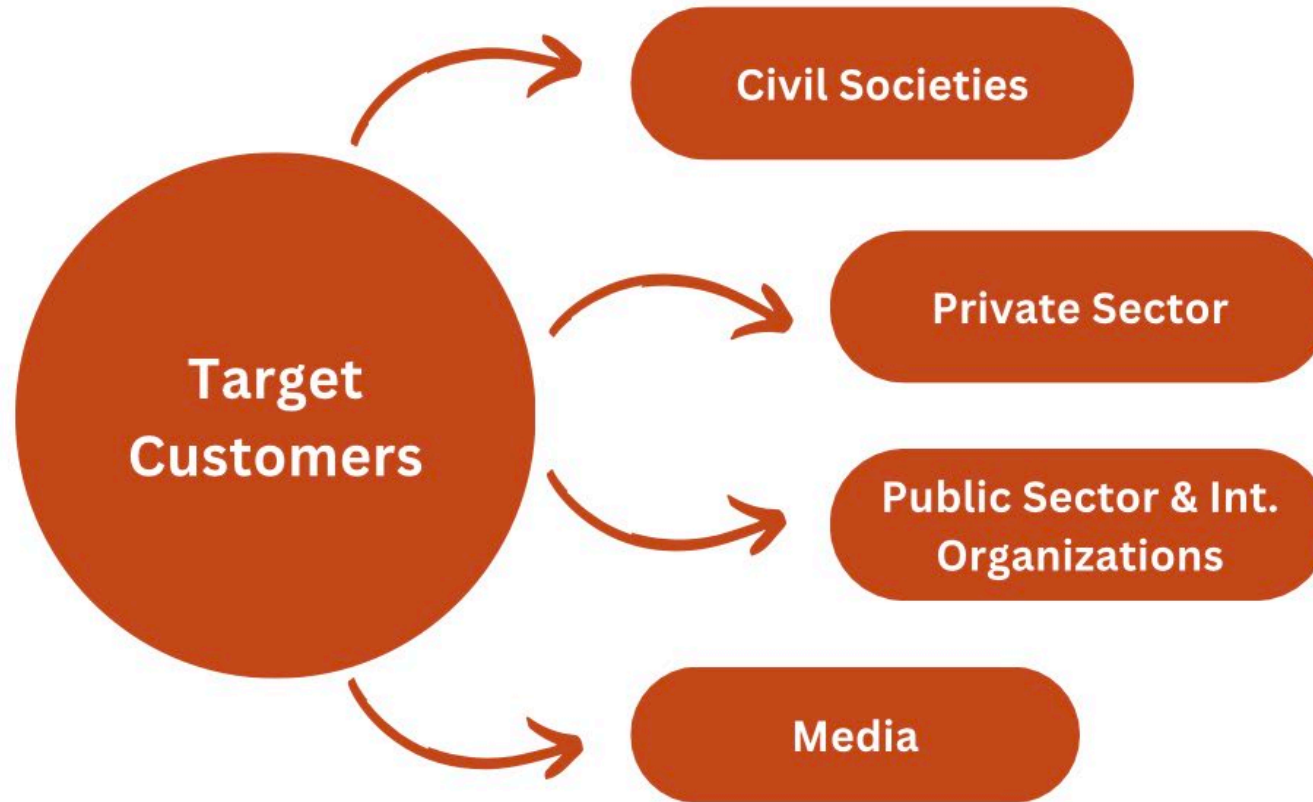
News | Border Disputes

Dozens killed as violence flares in region disputed by Sudan, South Sudan

It was the deadliest incident in a spate of attacks since 2021 in the oil-rich Abyei border region.



Source: www.aljazeera.com





- Access to georeferenced social media data
- Data integration is cumbersome especially with different data sources comes different formats
- Access to high veracity of OSINT
- Data security / Trust
- Cost

PeaceEye offers:

- Enhanced situational awareness
- Improved emergency preparedness
- Scalability and systematic methodology
- Data-driven climate resilience and conflict resolution in Africa

“Do you think a collaboration between Earth observation and local communities can foster peace in Africa?”