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Exploiting Sentinel 2 data to shift from fire danger to fire risk prediction

Paolo Fiorucci

Andrea Trucchia, Giorgio Meschi, Nicolò Perello, Silvia Degli Esposti, Umberto Morra di Cella,

Mirko D'Andrea, Guido Biondi

Luca Pulvirenti, Giuseppe Squicciarino, Elisabetta Fiori

Rischio Incendi e Coordinamento - RISICO

Fire risk and Coordination



RISICO started in 2000 as a **Forest Fire Danger Rating System** for the Liguria region...

2000

2003



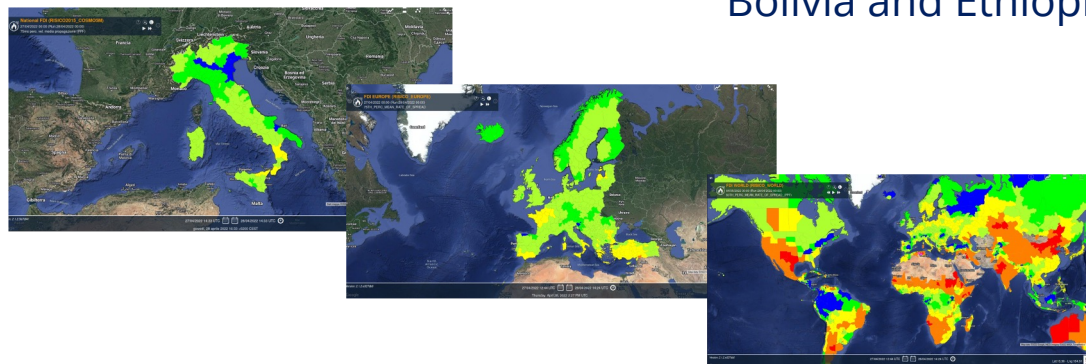
.... and then expanded nationwide in 2003 and adopted by the **national Civil Protection Department**

The model is **continuously updated**...



2007 - 2009 - 2011 - 2015 - ...

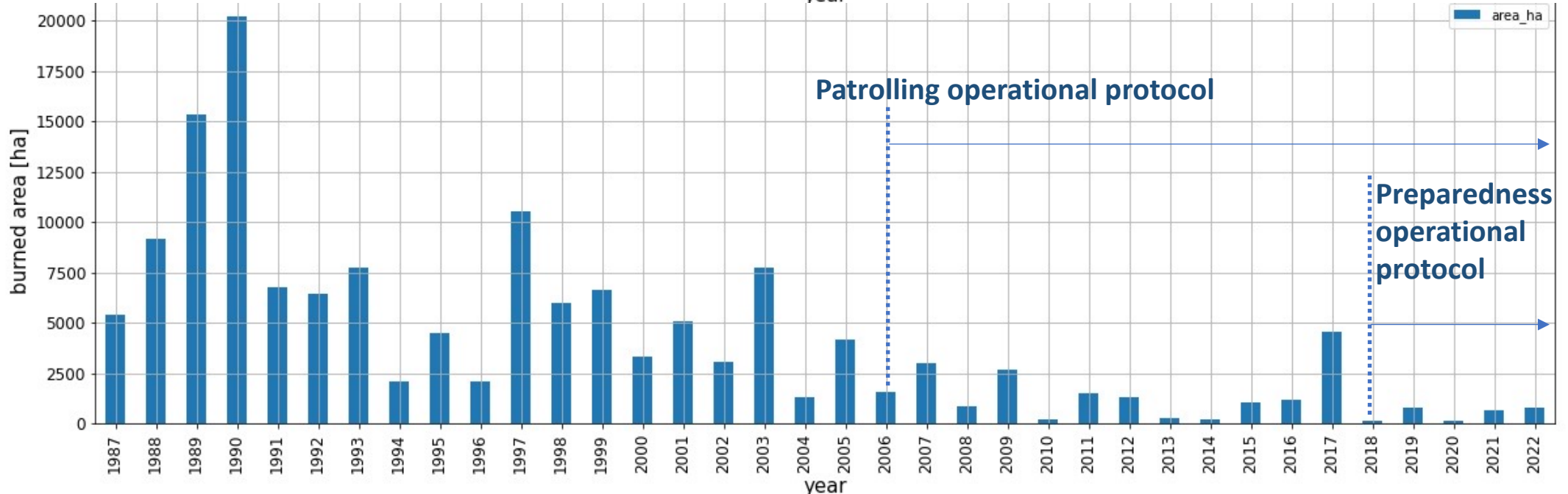
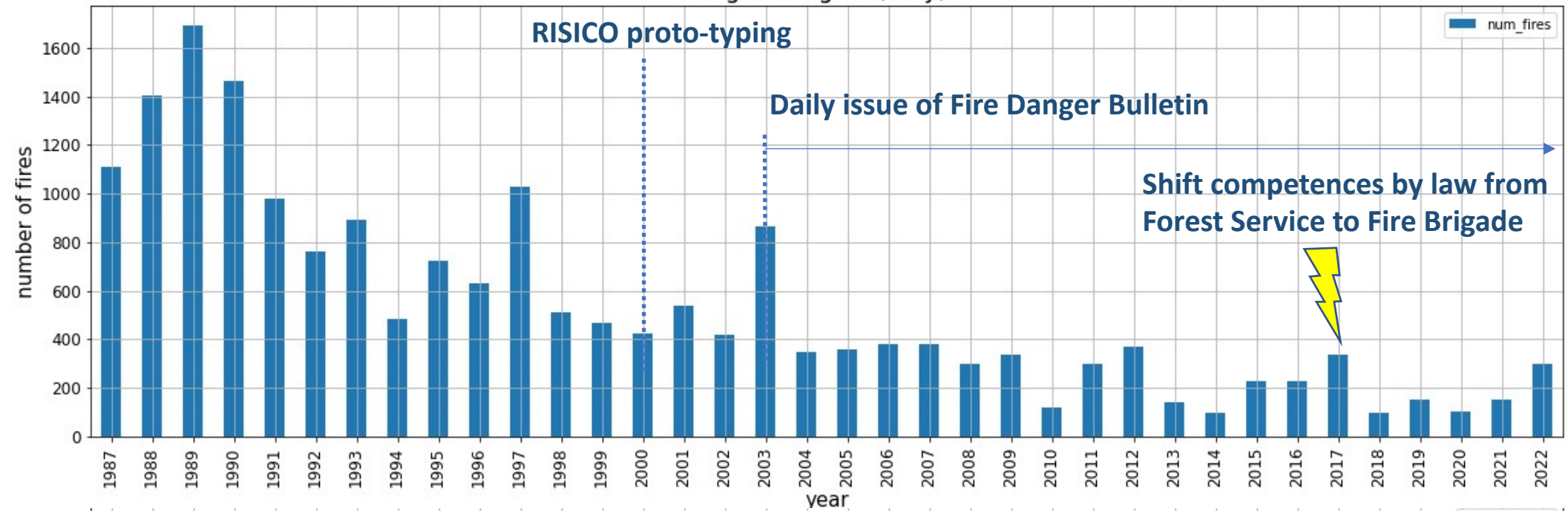
...and it has experimentally extended at global level



At present, RISICO is a **well-proven system** continuously updated to be adapted to operational needs

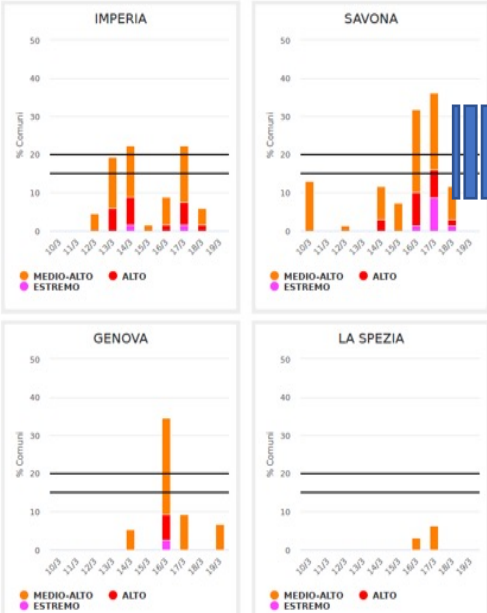
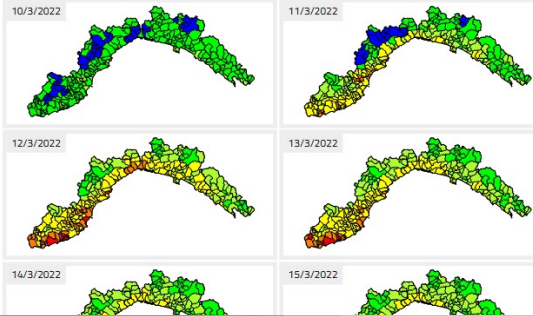
...and it is operational in several countries including Bolivia and Ethiopia

Liguria region (Italy)



Preparedness operational protocol

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Information

A significant part of the district is subject to high fire danger

Decision

Ministero dell'Interno
DIREZIONE REGIONALE DEI VIGILI DEL FUOCO, DEL SOCCORSO PUBBLICO E DELLA DIFESA CIVILE DELLA LIGURIA
Ufficio Servizio AIB

OGGETTO: Incendi boschivi. Potenziamento dispositivo di intervento AIB.

MESSAGGIO DI POSTA ELETTRONICA

Da	Sala Operativa Regionale	dir.salaop.liguria@cert.vigilfuoco.it
A	Comando Vigili del Fuoco Imperia	rom.salaop.imperia@cert.vigilfuoco.it
A	Comando Vigili del Fuoco Savona	rom.salaop.savona@cert.vigilfuoco.it
A	Comando Vigili del Fuoco Genova	rom.salaop.genova@cert.vigilfuoco.it

...
 IACQ.N - Roma: cent.operativovigilfuoco.it
 Al Fu. Dir. AIB Ernesto Crescenzi: ernesto.crescenzi@vigilfuoco.it
 Al Funzionario Responsabile SCUP: rosario.scupera@vigilfuoco.it
 Al Funzionario referente AIB della Regione Liguria: massimo.galardi@regione.liguria.it
 Al Referente Regionale EDS: r.dandini@vigilfuoco.it

A seguito di specifiche indicazioni su particolari situazioni di criticità con suscettibilità sopra al 15%, fornite dal bollettino SPIRL a lungo termine, relativamente alla provincia di Savona

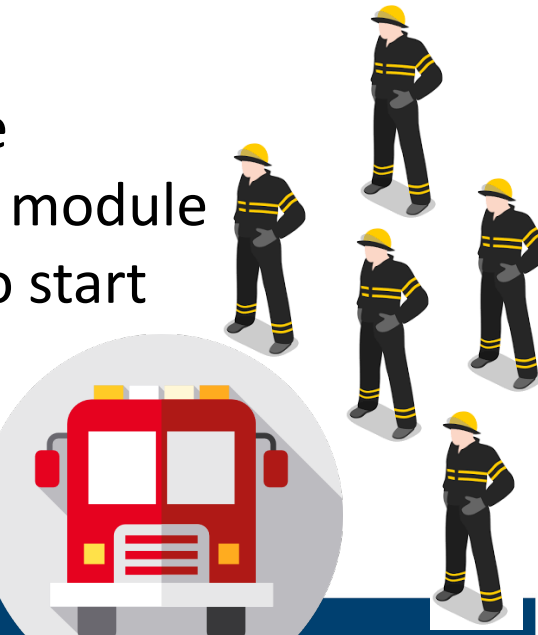
TENUTO CONTO

- che, in una più estesa valutazione del rischio d'incendio, intervergono ulteriori parametri riferibili al permanere dello stato di siccità dell'ambiente naturale boschivo;
- che è previsto un innalzamento dell'intensità dei venti;
- che è possibile un incremento della presenza antropica.

SIRTIENE

opportuno potenziare il dispositivo di soccorso ordinario dei Comandi liguri e pertanto si dispone in attuazione della "Convenzione" in essere con la Regione Liguria - il richiamo in servizio dedicato AIB di personale aggiuntivo dei Comandi come di seguito indicato.

Giorni	n.1 DOS + unità (2 unità)	n.1 squadra VVF (5 unità)	n.1 operatore gruppo Sub Operativo Comando Provinciale
04.11.2020	Imperia - Savona - Genova	Genova	Savona



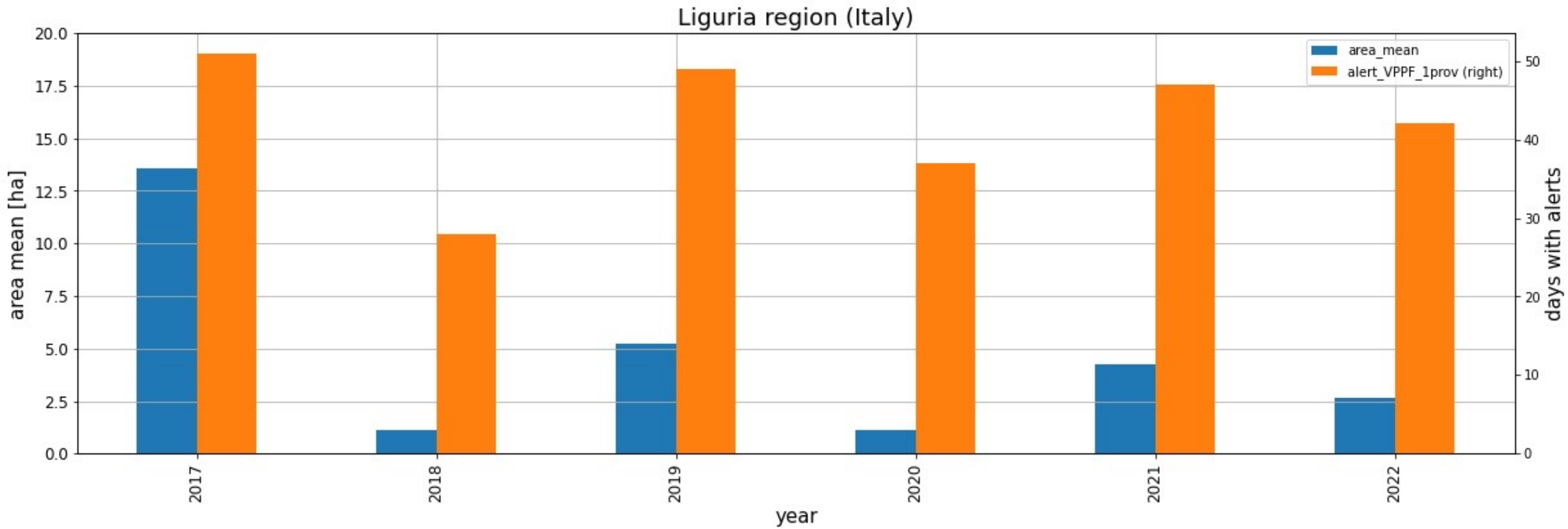
Action

One or more firefighting operation manager available



One fire fighting module ready to start

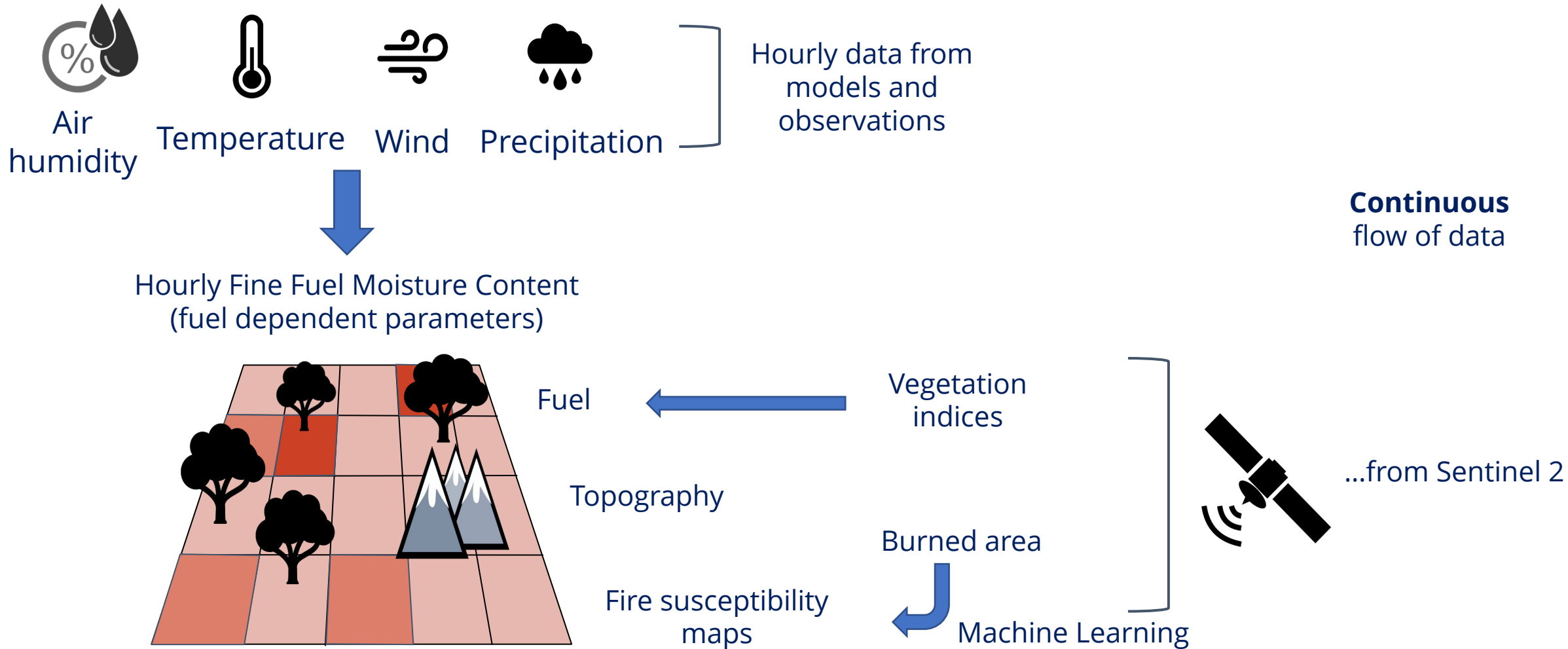
Impacts of preparedness SOP



- Annual average burned area
- Number of days of application of the preparedness protocol

Rischio Incendi e Coordinamento - RISICO

WildFire risk and Coordination



Rischio Incendi e Coordinamento - RISICO

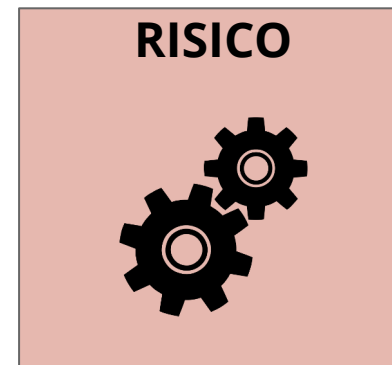
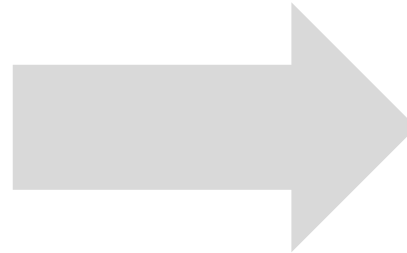
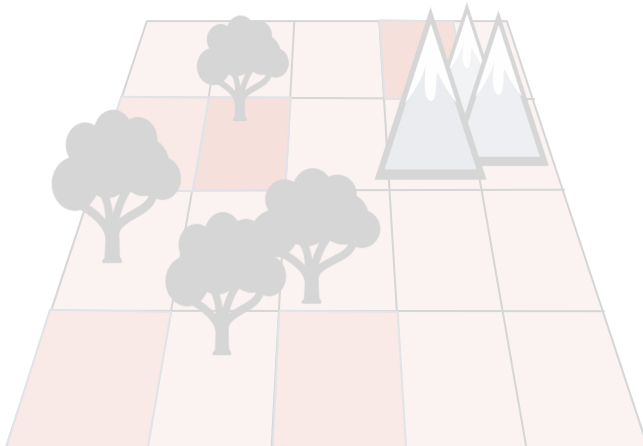
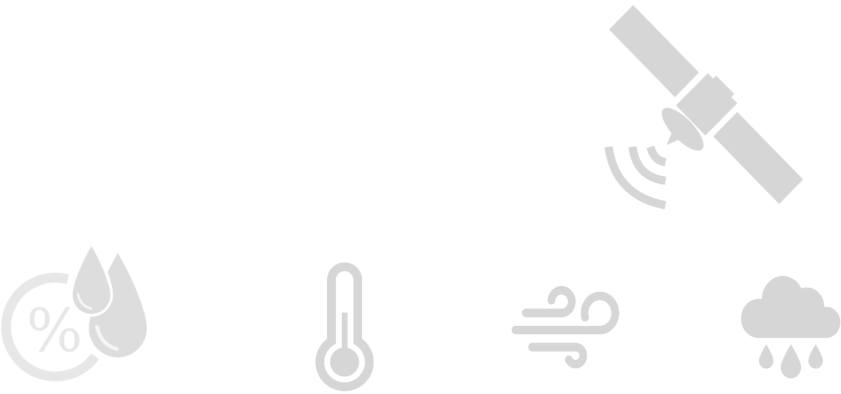
Fire risk and Coordination

 Run **every 3 hours**

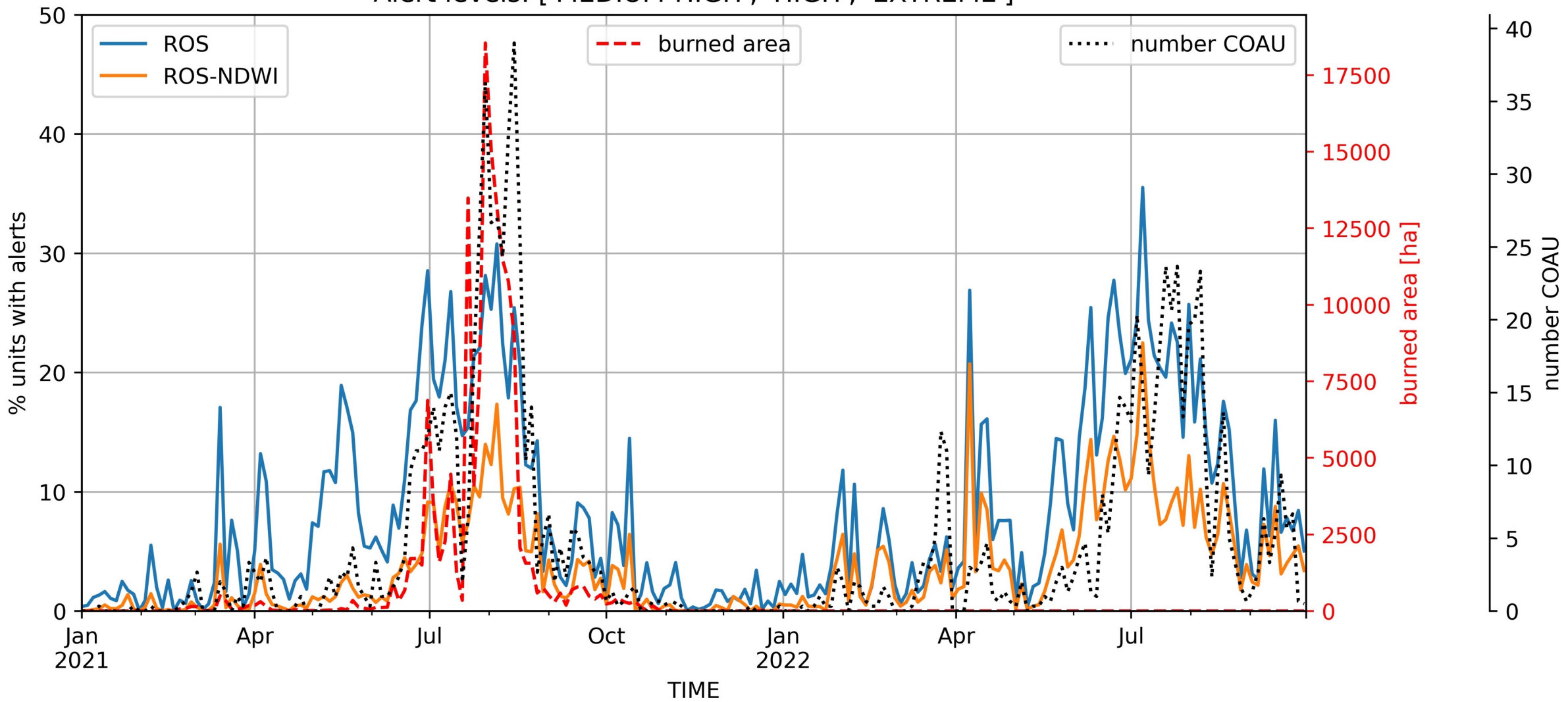
It is composed by different modules:

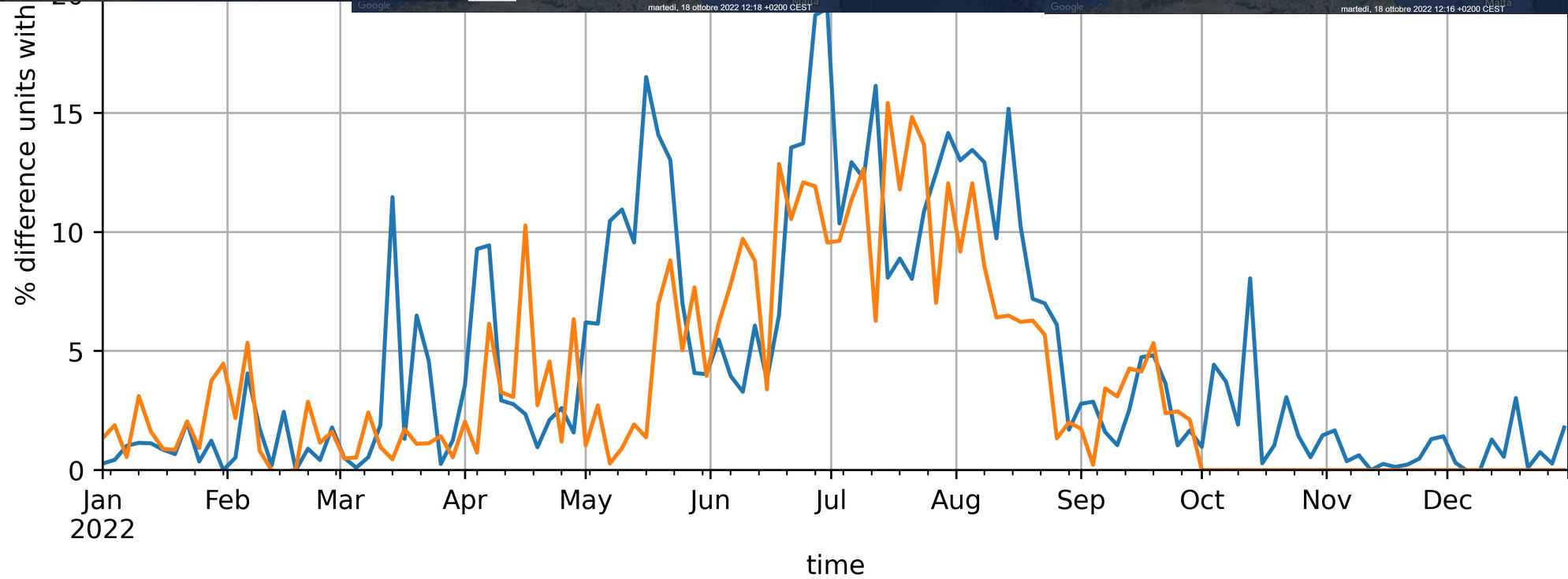
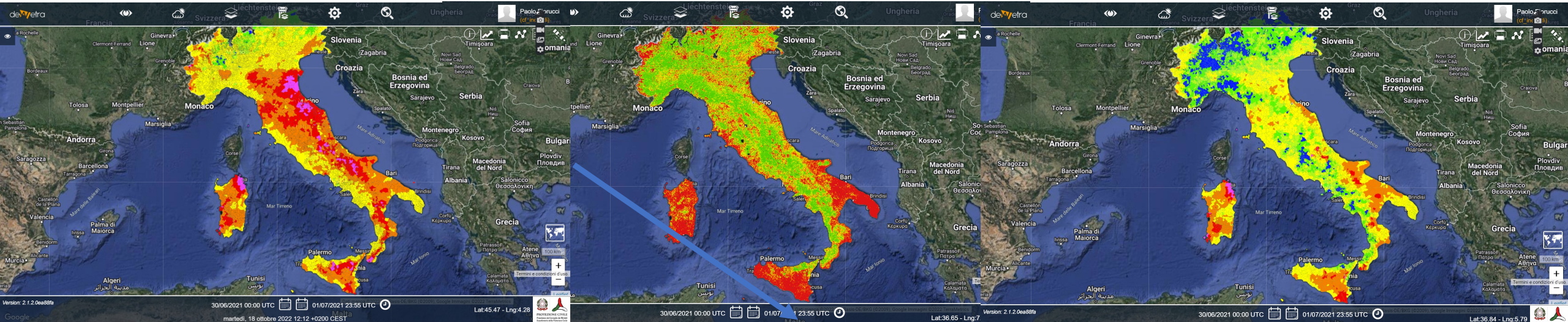
1. **Fine Fuel Moisture Content**
2. **Potential Rate Of Spread**
3. **Potential Fireline Intensity**
4. Fire susceptibility
5. Vegetation Indices

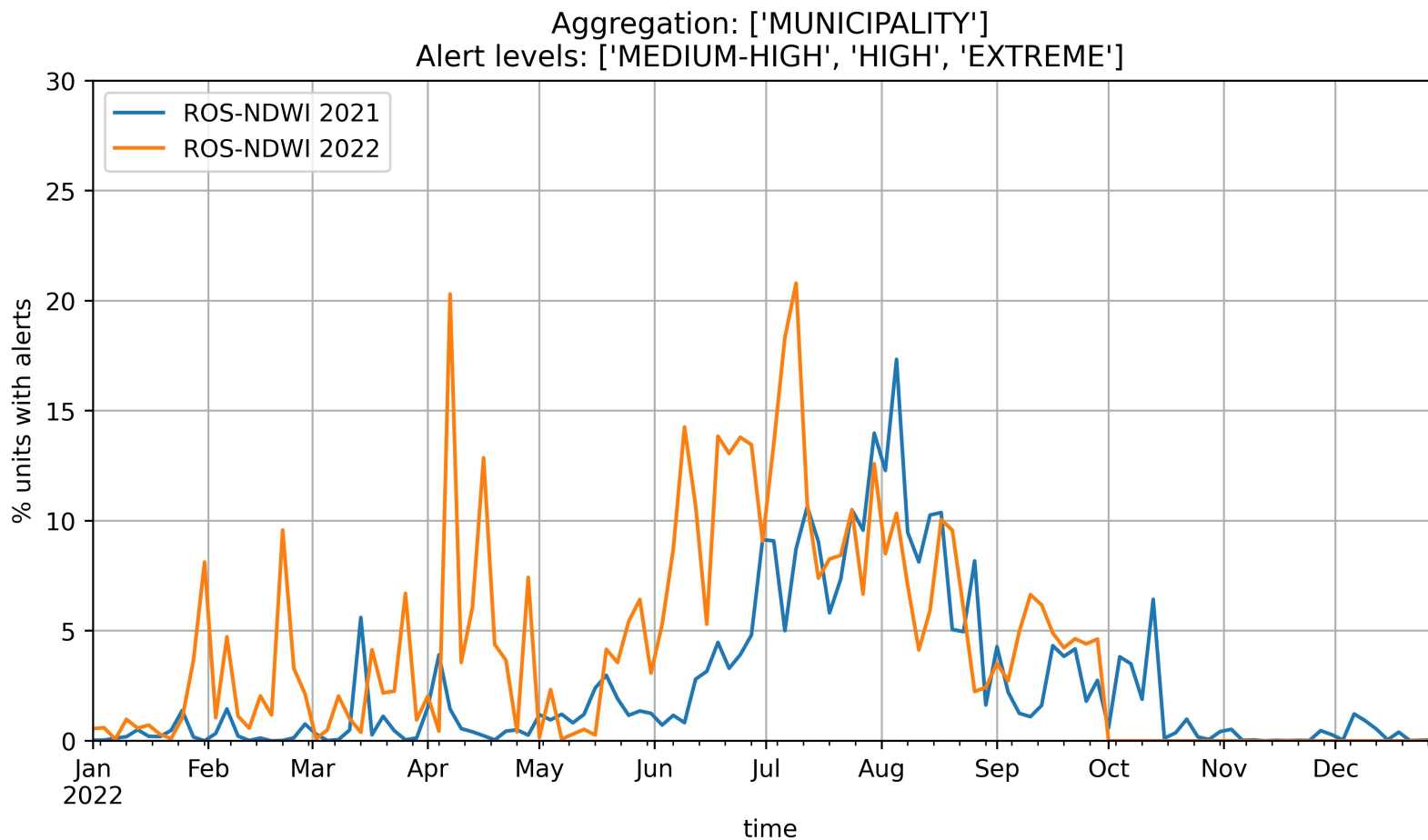
ROS → ROS-NDWI



Aggregation: ['MUNICIPALITY']
Alert levels: ['MEDIUM-HIGH', 'HIGH', 'EXTREME']







Variable: ROS
Aggregation unit: MUNICIPALITY

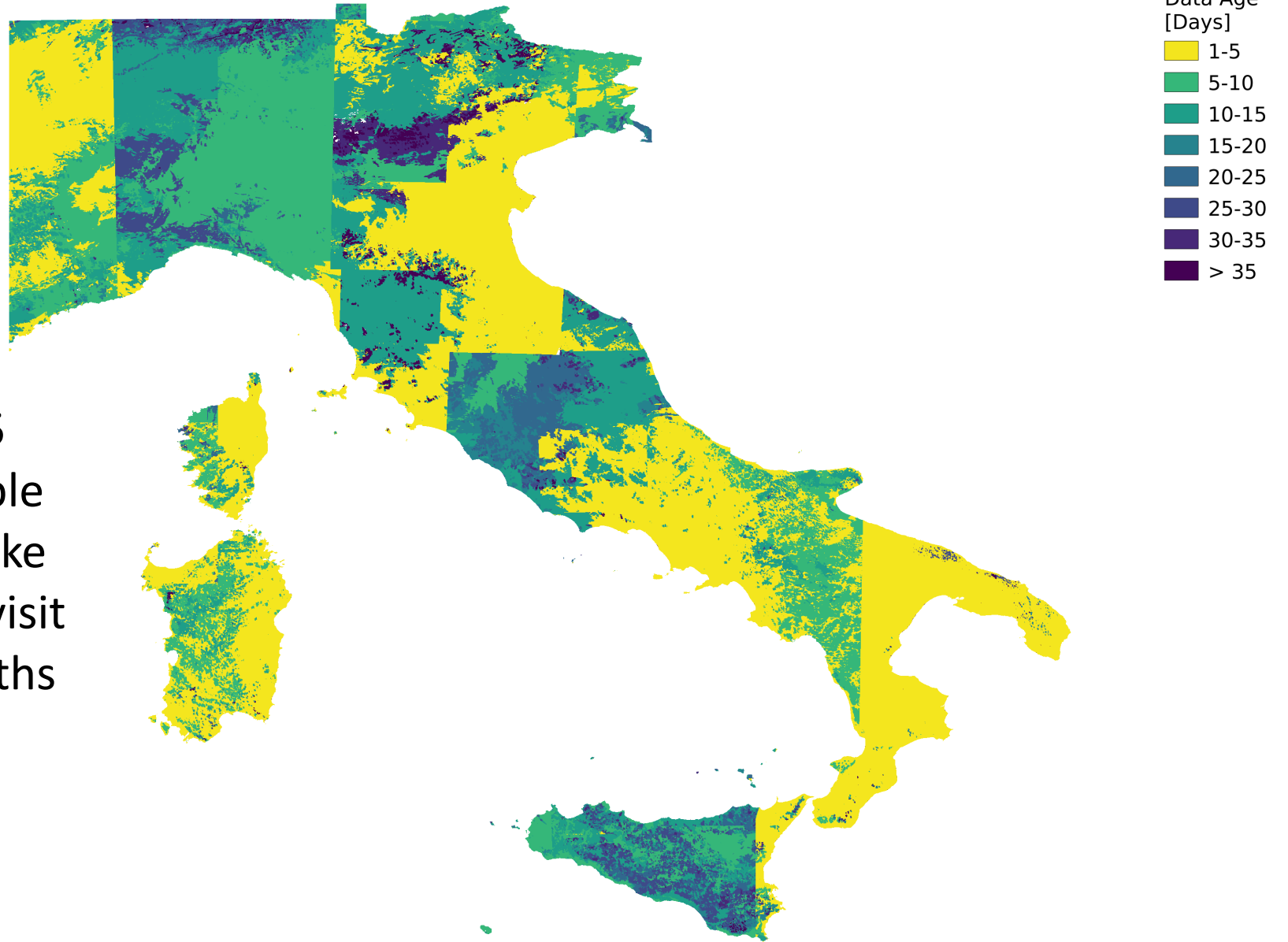
A>1000ha	0.0%	0.0%	0.0%	5.0%	45.0%	35.0%	15.0%
100ha<A<1000ha	0.0%	0.5%	0.0%	19.3%	47.2%	20.8%	12.3%
10ha<A<100ha	0.4%	0.0%	1.2%	37.7%	41.1%	14.7%	4.8%
0ha<A<10ha	0.3%	1.0%	7.0%	51.7%	29.3%	8.7%	2.0%
% tot area	8.8%	14.7%	23.5%	42.2%	8.6%	1.8%	0.3%
	VERY-LOW	LOW	MEDIUM-LOW	MEDIUM	MEDIUM-HIGH	HIGH	EXTREME
				ALERT			

Variable: ROS-NDWI
Aggregation unit: MUNICIPALITY

A>1000ha	0.0%	0.0%	0.0%	20.0%	40.0%	25.0%	15.0%
100ha<A<1000ha	0.0%	1.4%	4.2%	36.8%	31.6%	17.5%	8.5%
10ha<A<100ha	0.7%	2.7%	9.4%	47.6%	27.2%	9.8%	2.5%
0ha<A<10ha	2.4%	8.4%	19.1%	45.4%	19.0%	4.8%	0.9%
% tot area	21.8%	26.2%	24.4%	23.1%	3.7%	0.7%	0.1%
	VERY-LOW	LOW	MEDIUM-LOW	MEDIUM	MEDIUM-HIGH	HIGH	EXTREME
				ALERT			

LIMITATION

Revisit time of 5 days is acceptable but clouds, smoke can increase revisit time up to months



SOLUTION

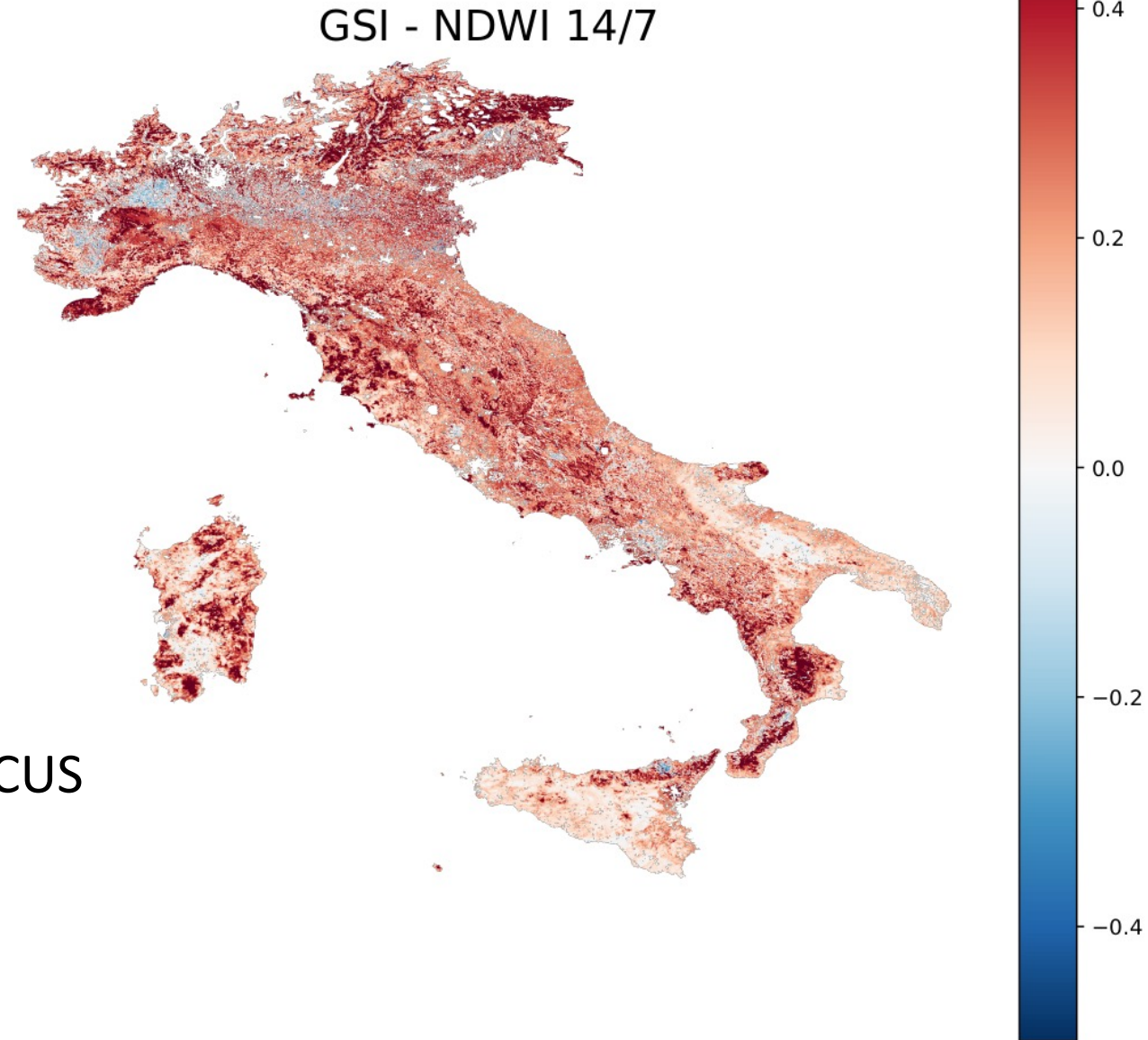
Gap filling using a phenological model

However, during long drought

Any help is more than welcome

It could be a potential COPERNICUS downstream service?

We are ready to use it





Thanks for your attention



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