

GEO South–Eastern Europe and Eastern
Mediterranean Symposium on
*Earth Observation Services for Monitoring the
Environment and Protecting the General Public*

Athens, 8-10 June 2009

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Earth Observation Activities of ESA

GMES Space related EC calls

The Living Planet Programme



ERS &
ENVISAT
Missions

Charter on
Space & Major
Disasters

Earth
Observation
Envelope
Programme
(EOEP)

Climate
Change
Initiative (CCI)

Earthnet /
Third Party
Missions

GEO and
GMES

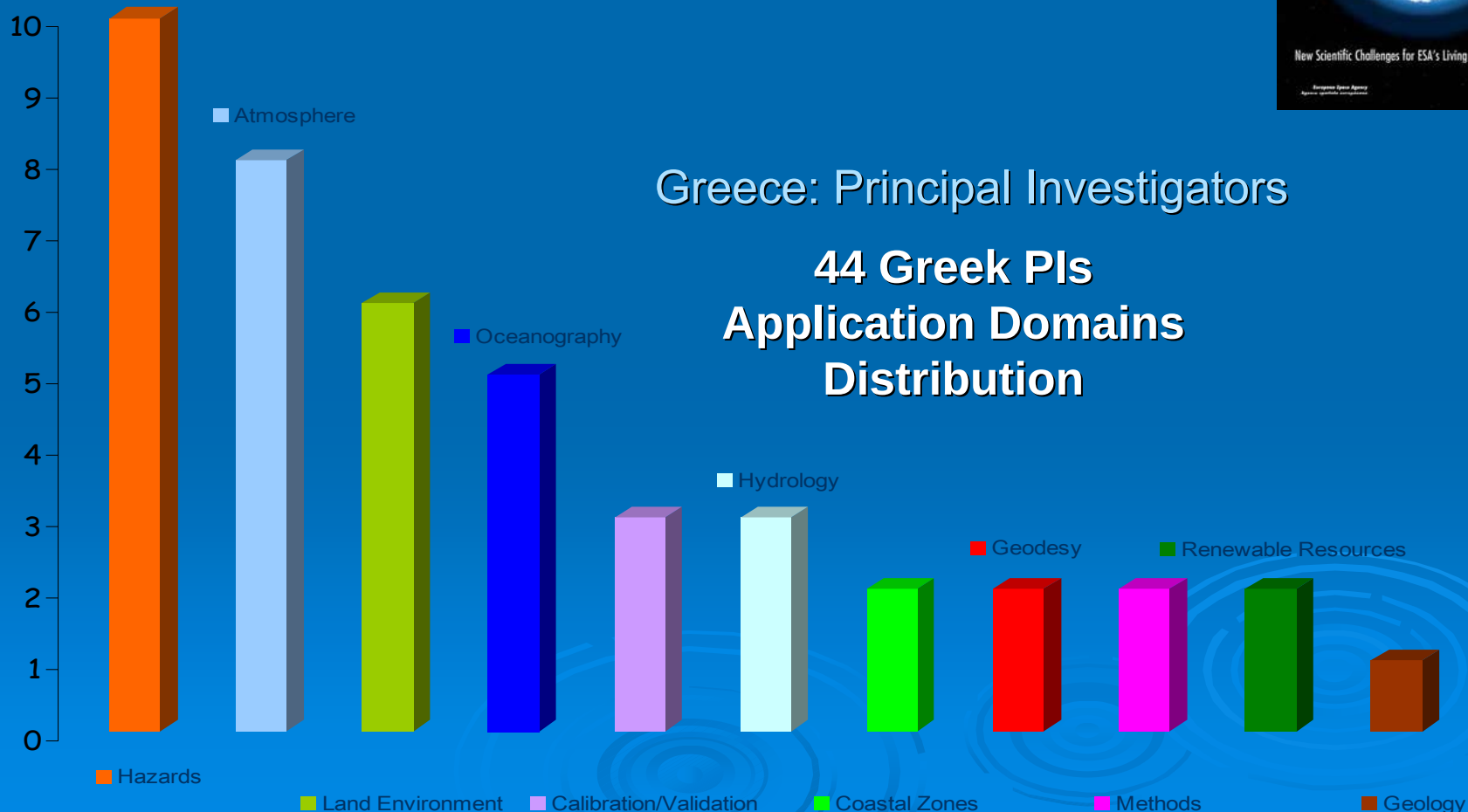
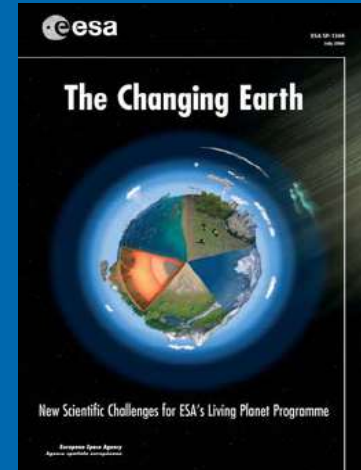
YELLOW:
With GR participation

GMES Space
Component (GSC)

Jointly with the EC

The ESA Earth Observation Envelope Programme

The EOEP is the backbone for implementing the Living Planet Strategy (ESA SP-1234 [1999] and SP-1303 [2006])



Greece: participation in GMES Services Element

➤ Forest Monitoring (K-P reporting)

- ***Geoapikonisis SA, Qualisys***
- ***National Observatory of Athens (user)***



➤ Marcoast (oil-spill drift forecasting)

- ***Hellenic Centre for Marine Research***
- ***Ministry of Mercantile Marine (user)***



➤ PROMOTE (Air Quality)

- ***Aristotle U. Thessaloniki; National & Kapodestrian U. Athens***
- ***Region of Central Macedonia (user)***

➤ Terrafirma (Land motion)

- ***Earthquake Planning & Protection Office (user)***
- ***Institute of Geology & Mineral Exploitation (user)***



➤ Mariss (Maritime Security)

- ***National Observatory of Athens***
- ***Ministry of Mercantile Marine (user)***



EO exploitation under Greek task force 1st call

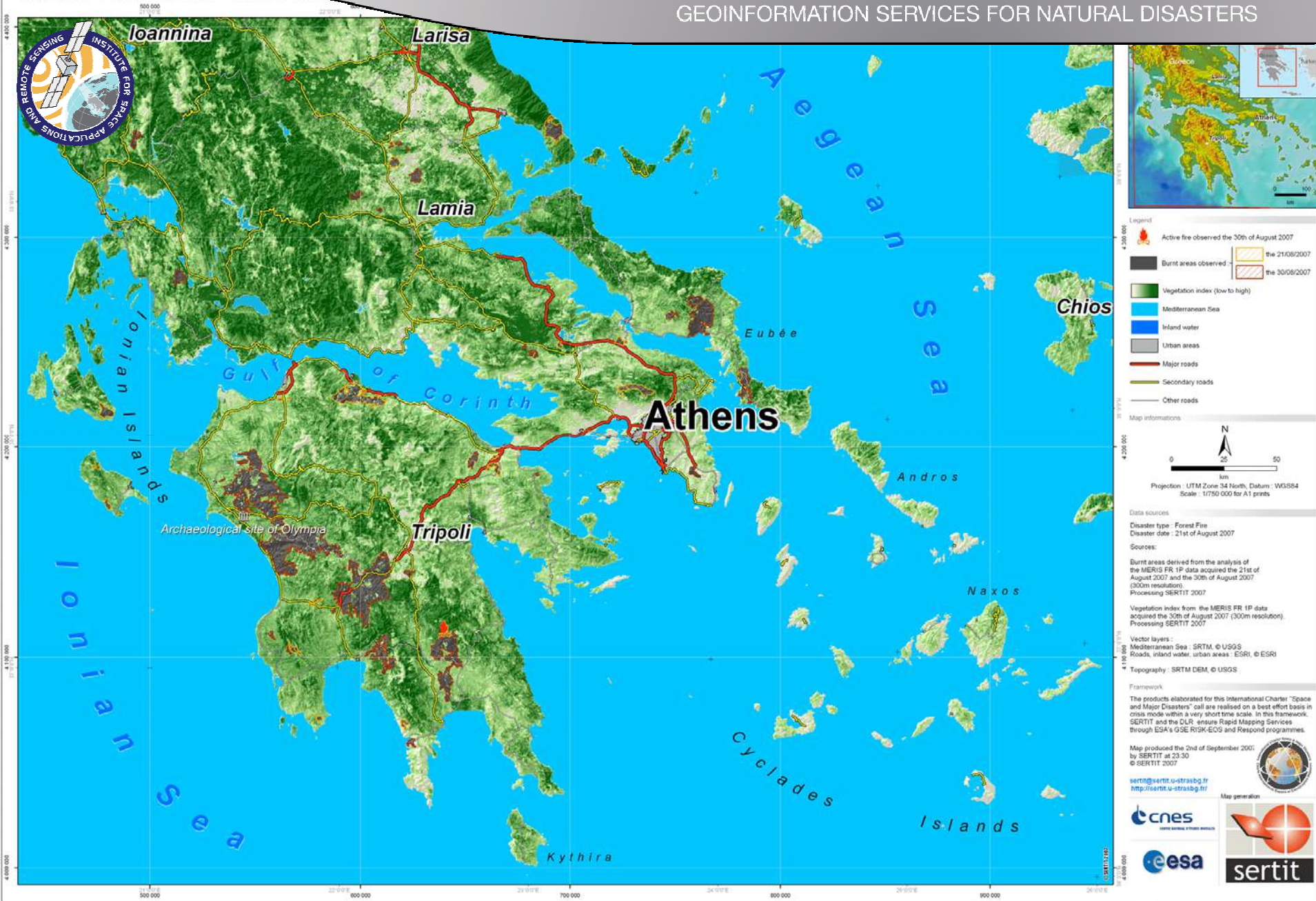
8 projects (6 relevant for GSE)

Activity	Greek Partner	Contract
Monitoring & Control of Greek Borders and Coastline	Space Hellas SA	MARISS
Burnt Scar mapping in Greek territory	NOA/ISARS	Risk-EOS
EO for Coastal surveillance and tracing of polluting ships	MARAC Electronics Geoapikonisis SA NOA/ISARS	Marcoast
Risk assessment of structures & plants in areas susceptible to ground deformation	Harokopio University of Athens	Terrafirma
Comparison between NO₂ Columnar measurements from ground and satellite	National & Kapodistrian University of Athens	Promote
EO for monitoring of water use in Greece	Aristotle University of Thessaloniki	GSE-Land
High-res imagery for flood-plain mapping	Technical University of Crete	
Survey of Greek capabilities in EO	IridaLabs	

RISK-EOS

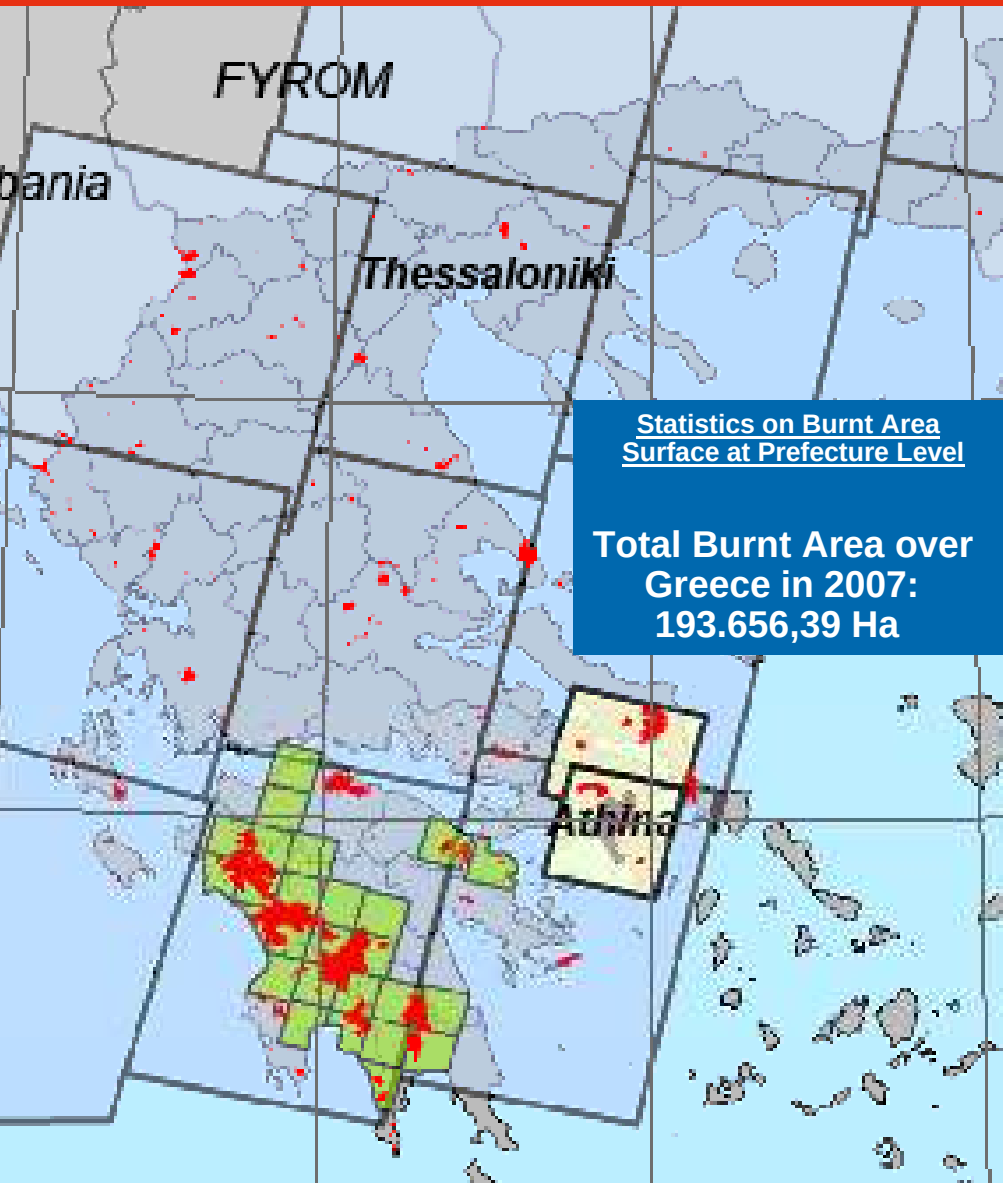
GEOINFORMATION SERVICES FOR NATURAL DISASTERS

GREECE - Peloponnese - Forest fires





BSM Damage Assessment Statistics & GIS Products



BURNED AREA PER PREFECTURE (IN HECTARES)

NΟΜΟΣ	ΚΩΔΙΚΟΣ ΦΥΛΛΟΥ ΧΑΡΤΗ	ΚΑΜΕΝΗ ΕΚΤΑΣΗ (Ha)
ETOLIA AND AKARNANIA	GR01	2 736.60
ARGOLIDA	GR02	697.01
ARCADIA	GR03.1 - GR03.3	38 135.29
ARTA	GR04	924.23
ATHINA, ANATOLIKI (EASTERN)	GR05.1 - GR05.4	5 124.71
ATTIKI, DYTIKI (WESTERN) ATTIKI		
ACHAIA	GR06	9 976.00
VIOTIA	GR07	4 283.86
GREVENA	GR08	2.83
DRAMA		163.45
EVROS	GR09.1- GR09.2	105.67
EVIA		20 852.26
ZAKYNTHOS	GR10	948.10
ILIA	GR11.1- GR11.2	45 340.91
IMATHIA	GR12	56.10
THESPROTIA		2 070.19
THESSALONIKI	GR13	1 856.45
IOANNINA	GR14	476.53
KARDITSA	GR15	217.54
KASTORIA	GR16.1 - GR16.2	1 897.49
KERKYRA		93.21
KEFALLONIA	GR17	2 675.94
KILKIS		128.63
KOZANI	GR18.1 - GR18.2	1 319.74
KORINTHIA	GR19	2 550.50
LACONIA	GR20.1 - GR20.2	17 806.21
LARISA		2 354.28
LESVOS	GR21	7.91
LEFKADA	GR22.1- GR22.2	3.92
MAGNISIA		6 008.50
MESSINIA	GR23	15 213.88
XANTHI	GR24	39.49
PIREAS		1 674.19
PELLA	(Βλέπε) GR18.2	183.88
PIERIA		432.09
PREVEZA	GR25	725.72
RODOPI	GR26	26.76
SERRES		195.50
TRIKALA	GR27.1- GR27.2	67.96
FTHIOTIDA		4 156.68
FLORINA	GR28	2 112.52
FOKIDA		13.66

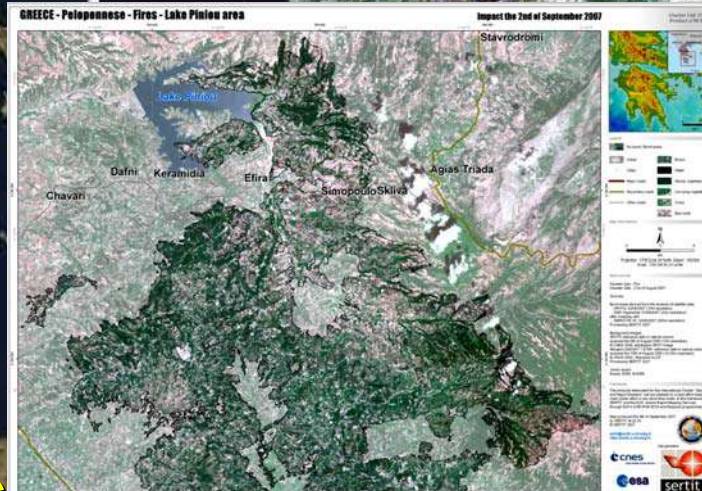
TOTAL AREA (acres)

193 656.39

RISK-EOS

GEOINFORMATION SERVICES FOR NATURAL DISASTERS

Rapid Fire Mapping



THE
HELLENIC
CIVIL
PROTECTION
INITIATES
CHARTER &
MAJOR
DISASTERS



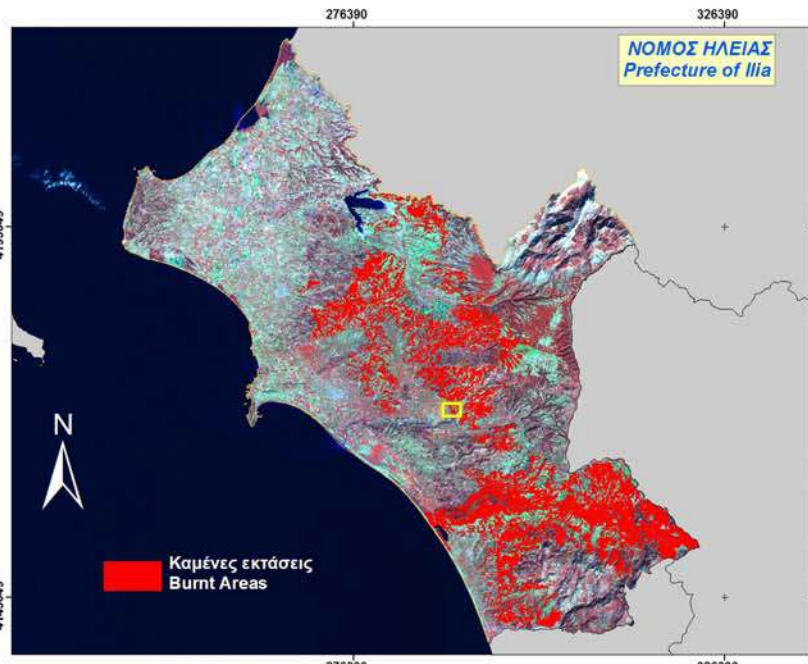
SAFER & LinkER EO
GR: ISARS/NOA

Special Edition

Report on RISK-EOS extension to Greece



Αρ. Φύλλου Χάρτη
Sheet No.
BSM GR11.1



Χαρτογραφική Προβολή: ΕΓΣΑ87
Ελλειψοειδής: WGS84
Scale 1:300.000

Cartographic Projection System: EGSA87
Ellipsoid: Geodetic Reference System 80
Landsat-5 TM, 28.09.07

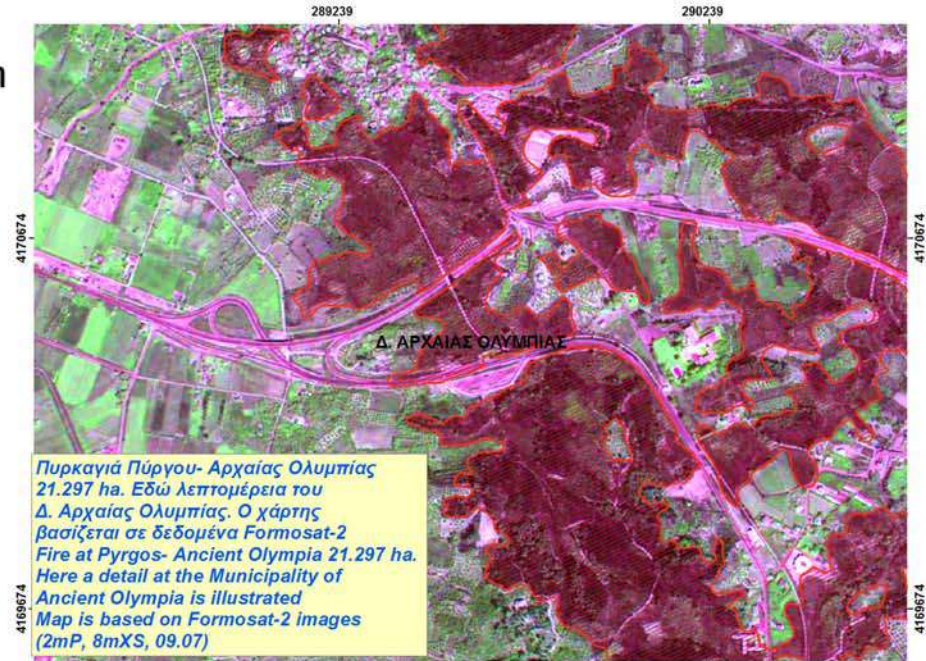
ΝΟΜΟΣ ΗΛΕΙΑΣ
Prefecture of Ilia



Χαρτογράφηση Καμένων Εκτάσεων 2007
με χρήση Δορυφορικών Εικόνων
Επέκταση του προγράμματος RISK-EOS στην Ελλάδα
Burn Scar Mapping in Greece for Year 2007
RISK-EOS, Extension to Greece



Εθνικό Αστεροσκοπείο Αθηνών
Ινστιτούτο Διαστημικών Εφαρμογών και Τηλεπισκόπησης
National Observatory of Athens
Institute for Space Applications and Remote Sensing
Υπουργείο Αγροτικής Ανάπτυξης & Τροφίμων
Γενική Διεύθυνση Ανάπτυξης και Προστασίας Δασών και
Φυσικού Περιβάλλοντος
Hellenic Ministry of Rural Development and Food
Directorate General for Development and Protection of Forests and
Natural Environment



Πυρκαγιά Πύργου- Αρχαίας Ολυμπίας
21.297 ha. Εδώ λεπτομέρεια του
Δ. Αρχαίας Ολυμπίας. Ο χάρτης
βασίζεται σε δεδομένα Formosat-2
Fire at Pyrgos- Ancient Olympia 21.297 ha.
Here a detail at the Municipality of
Ancient Olympia is illustrated
Map is based on Formosat-2 images
(2mP, 8mXS, 09.07)

Scale 1:6.000

Καμένες εκτάσεις/ Burnt Areas

ΚΑΜΕΝΕΣ ΕΚΤΑΣΕΙΣ ΣΤΟ ΣΥΝΟΛΟ ΤΟΥ ΝΟΜΟΥ
Burnt surfaces in the entire Prefecture

Αποτίμηση καταστροφών ανά κατηγορία Κάλυψης Γης κατά CORINE Land Cover 2000 (Burnt area assessment per CORINE Land Cover 2000 class)	Έκταση σε ha (Area in ha)
Δάσος Πλατύφυλλων (Broad-leaved Forest)	258,92
Δάσος Κωνοφόρων (Coniferous Forest)	3.385,92
Μικτό Δάσος (Mixed Forest)	5.418,52
Φυσιικοί Βοσκότοποι (Natural Grassland)	1.336,53
Θάμνοι και Χερσότοποι (Moors and Heathland)	0,00
Σκληροφυλλική Βλάστηση (Sclerophyllous Vegetation)	9.483,41
Γεωργικές και Λοιπές εκτάσεις (Agricultural and Other Areas)	25.457,61
Συνολική Έκταση (Total Area)	45.340,91

Data User Programme



Urban Heat Island, 10 European cities GR: ISARS/NOA

- Forecast the impact of UHI during heat waves through appropriate alert systems.
- Reduce the risk of UHI in the metropolitan areas through appropriate land planning policies.
- Study of the energy balance of the cities for a better response to the urban energy efficiency policies.
- Study of a dedicated IR satellite sensor with higher spatial resolution and revisiting time for a more adequate provision of Land Surface Temperature (LST) retrievals in the metropolitan areas of European cities.



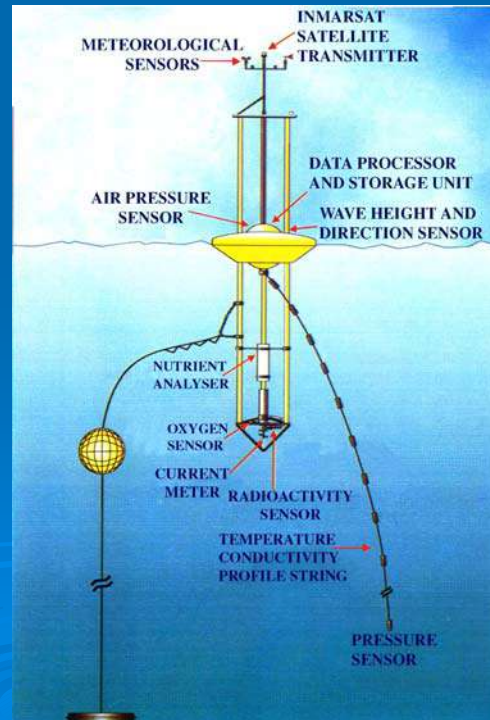
In- situ Observing capabilities

MARINE Environment monitoring capabilities

- The National Centre for Marine Research maintains the operation of **POSEIDON** system, which is an operational monitoring, forecasting and information system for the Greek Seas.

The **POSEIDON** components are:

- ✉ **11 Seawatch Buoys**
- ✉ **3 Operational forecasting models**
- ✉ **Data every 3 hours**
- ✉ **72h Forecasts every day**



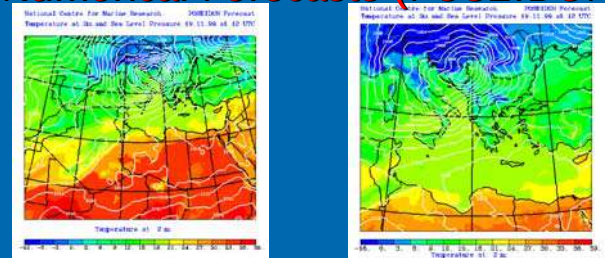
SeaWatch Buoys

- **Meteorological Sensors**
 - Air Temperature
 - Atm. Pressure
 - Wind Speed / Direction
- **“Blue” Sensors**
 - Temperature
 - Salinity
 - Current
 - Waves
- **“Green” Sensors**
 - Dissolved Oxygen
 - Chlorophyll-A
 - Light Attenuation
 - Radioactivity

Ships of Opportunity data (MFS – Ferry Box projects)

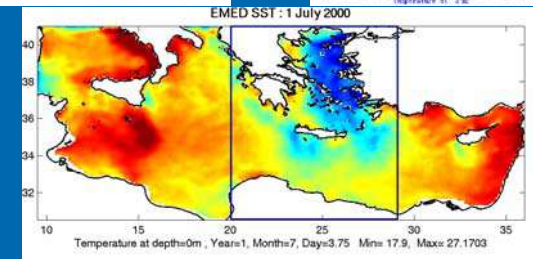
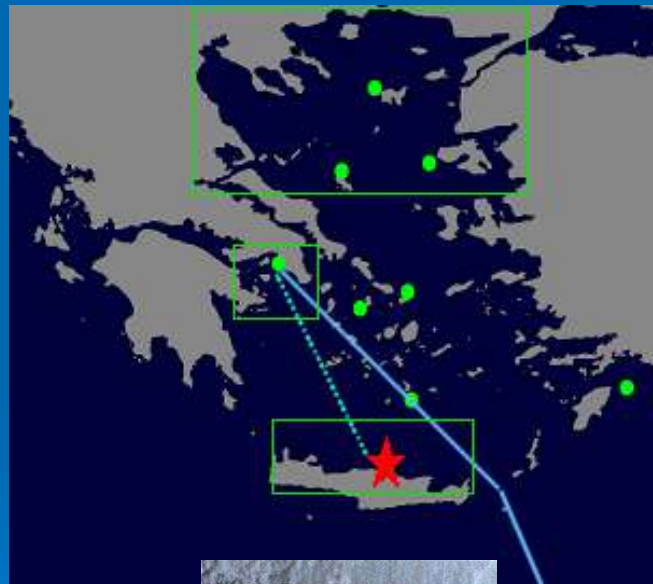


Ships of Opportunity data (MFS – Ferry Box projects)

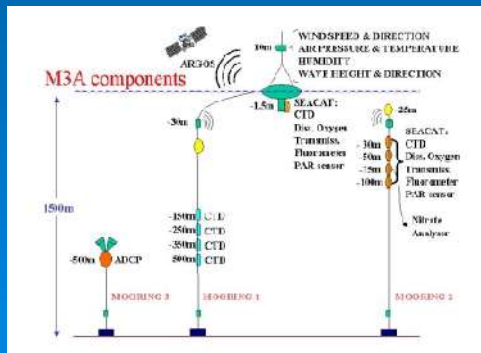
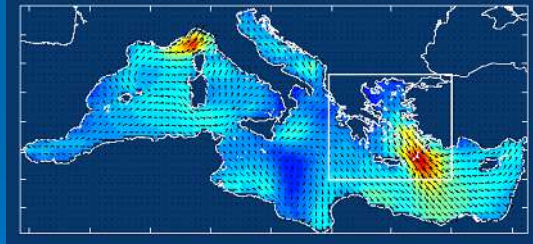


Numerical Forecasts (POSEIDON)

A yellow, dome-shaped buoy with a textured surface of small bumps. It features the 'Smart-800' logo and a red and white striped flag on its side. The buoy is floating in dark, choppy water.



Significant wave height and direction on 08/07/01 Hour:00:00 UTC



M3A system (MFS project)



SAR data (Marcoast project)



In- situ Observing capabilities

WEATHER monitoring capabilities

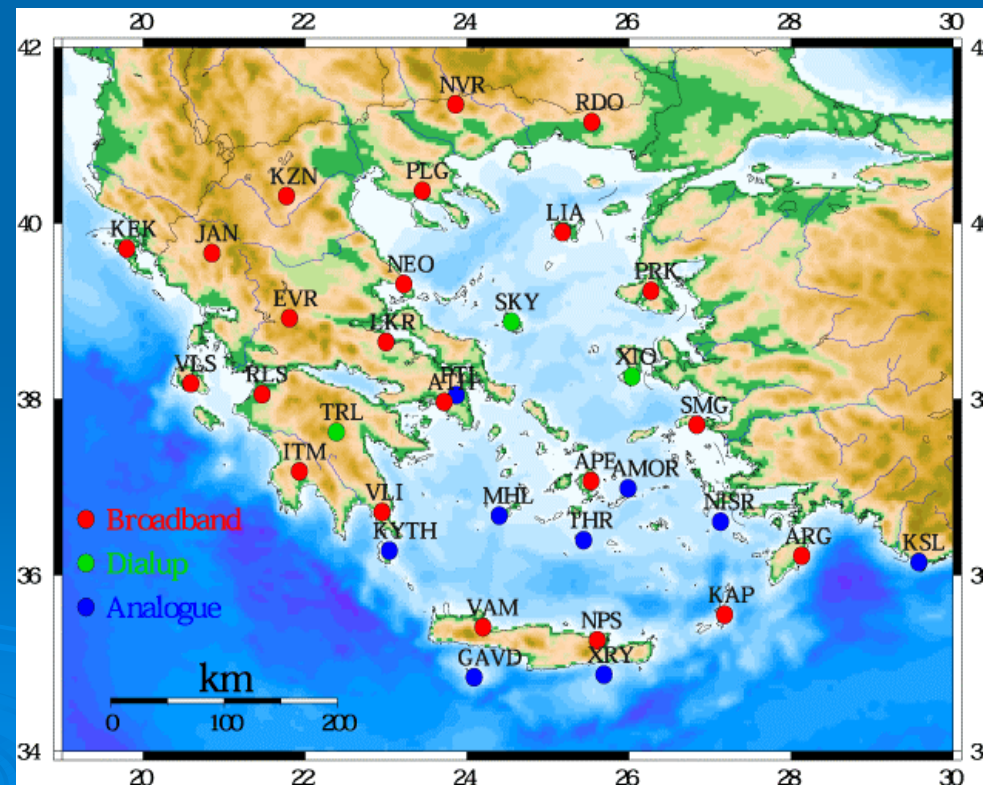
- *The Hellenic National Meteorological Service operates a big network of ground stations, plus 20 automatic, 4 upper atmosphere stations, and two satellite receiving stations (NOAA/AVHRR, METEOSAT) to provide on a continuous basis weather, climate and agro-meteorological data.*

The HNMS runs a variety of weather forecasting models based on the ECMWF model providing real time forecasts for the next 120 up to 240 hours

In- situ Observing capabilities

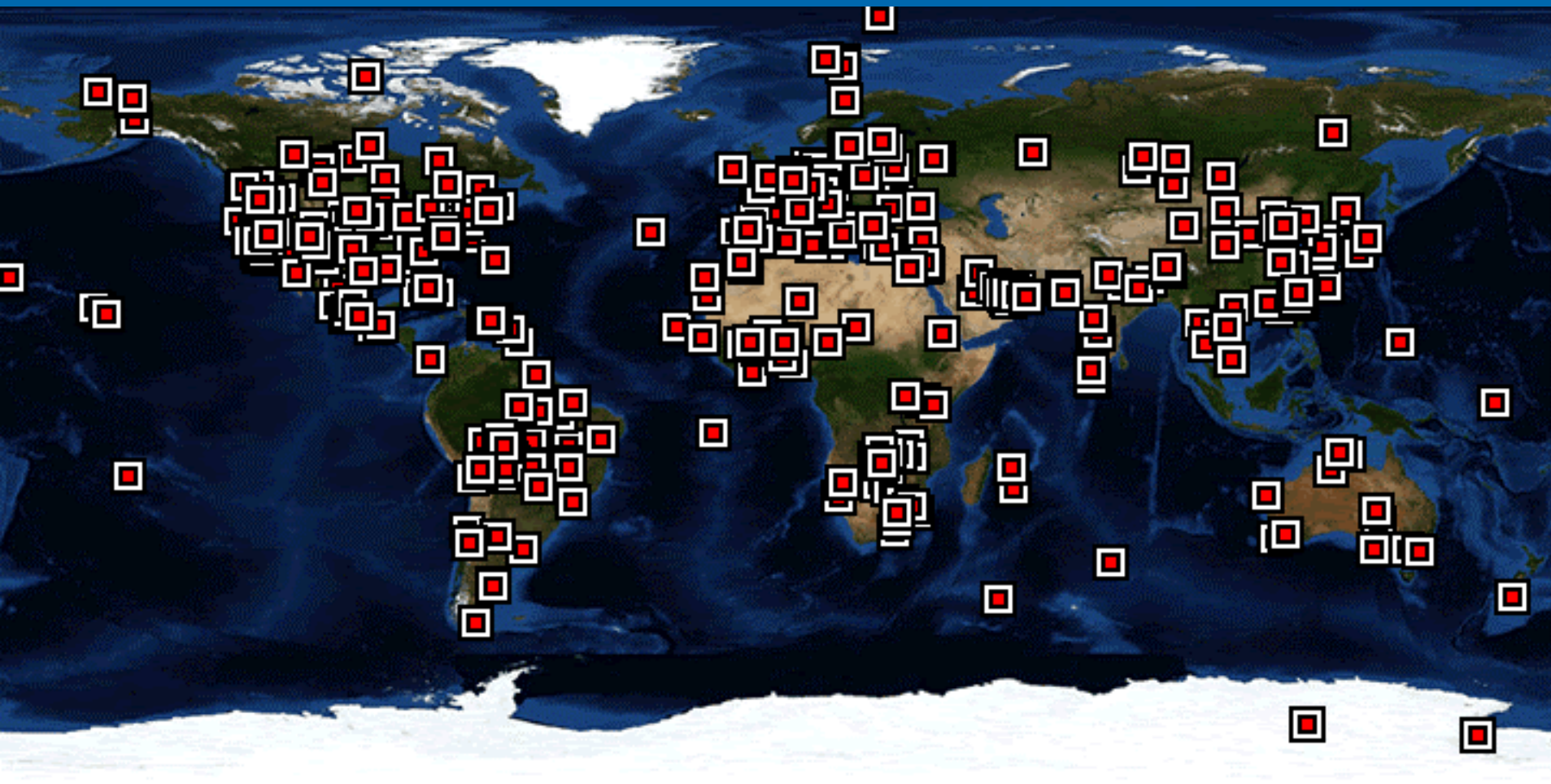
GEODYNAMICS monitoring

- The Geodynamics Institute of the National Observatory of Athens operates the national seismographic network comprising of stations, digital broadband, dialup and analogue ones. This network provides a multi-parametric solution having the ability to transmit in real time EARTHQUAKE parameters



In- situ Observing capabilities

AERONET: A Global Robotic Network for Aerosol Research



321 CIMEL sunphotometers

<http://aeronet.gsfc.nasa.gov>

In- situ Observing capabilities

AERONET stations in Greece



Crete (35N, 25E)



Thessaloniki (40N, 22E)



Athens - NOA (37N, 23E)



Ksanthi (41N, 24E)

In- situ Observing capabilities

EARLINET: A European Lidar Network for Aerosol Research



EARLINET-ASOS

European
Aerosol Research
Lidar NETwork -
Advanced
Sustainable
Observation
System



RIVM-Bilthoven, NL



ON-Neuchâtel, CH



FZK-Garmisch
Partenkirchen, DE



MPIMET-
Hamburg, DE



NILU-Andøya, NO



UP-Potsdam, DE



IFT-Leipzig, DE



EPFL-Lausanne, CH



CNRS-Palaiseau, FR



UPC-Barcelona, ES



CIEMAT-Madrid, ES



UNIAQ-L'Aquila, IT



CNISM-Napoli, IT



CNR-IMAA
Potenza, IT



UNILE-Lecce, IT



LMU-München, DE



BISIP.SMO-Minsk, BY



IE.BAS-Sofia, BG



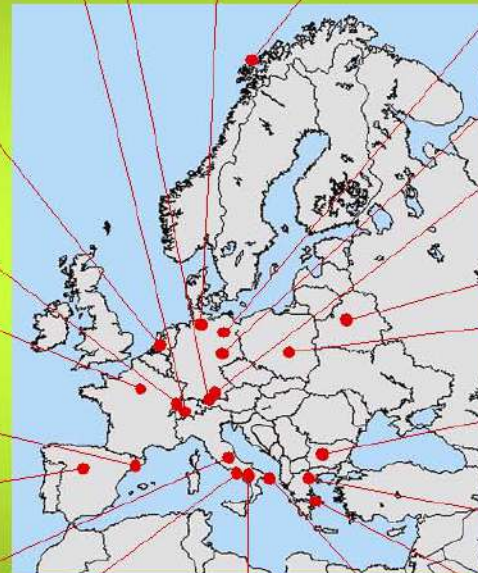
IGPAS-Belsk, PL



AUTH-Thessaloniki, EL



NTUA-Athens, EL



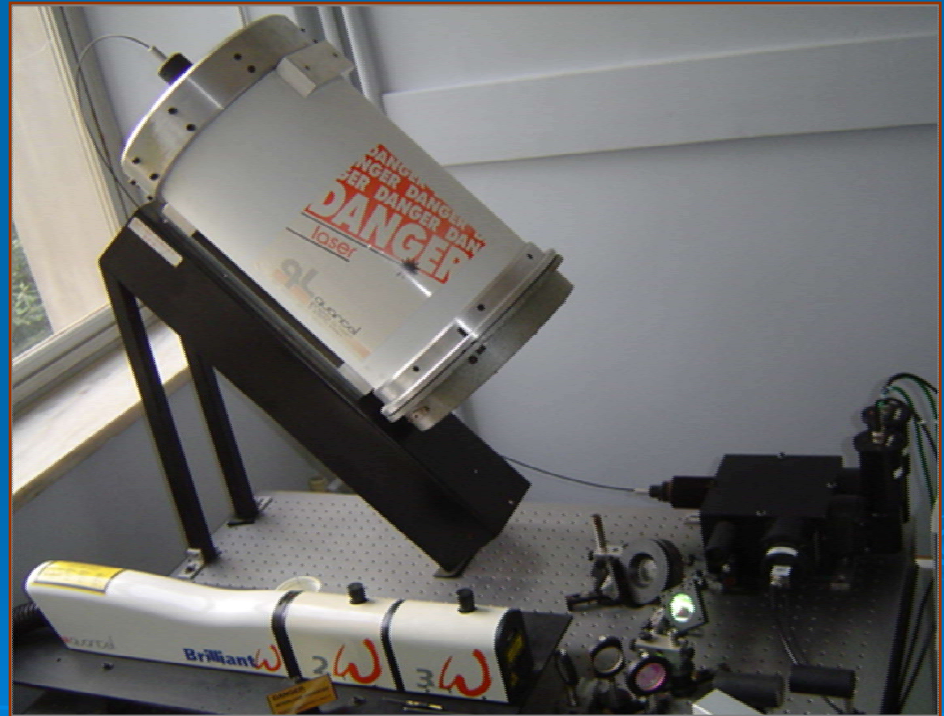
In- situ Observing capabilities

EARLINET stations in Greece



Thessaloniki (Aristotle University of Thessaloniki)

Athens (National Technical University of Athens)



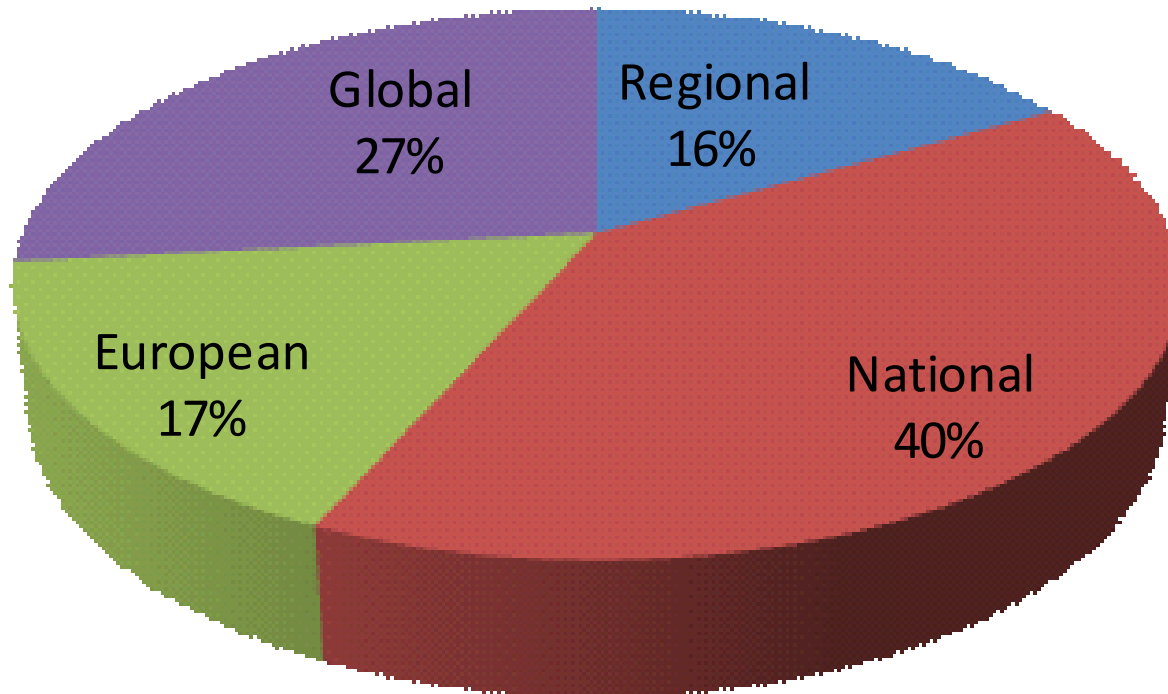
MAPPING THE GREEK REQUIREMENTS AND CAPABILITIES IN EARTH OBSERVATION

Two studies:

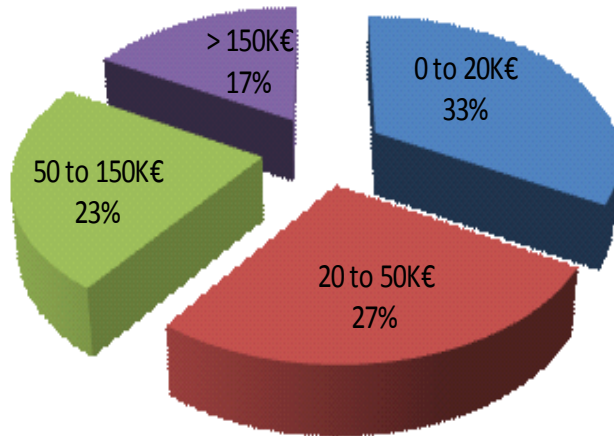
- An EC supported study run for the period (1997-2000) under the auspices of the former **Hellenic Space Research and Technology Committee**
- An ESA supported update study under realisation by **IridaLabs**



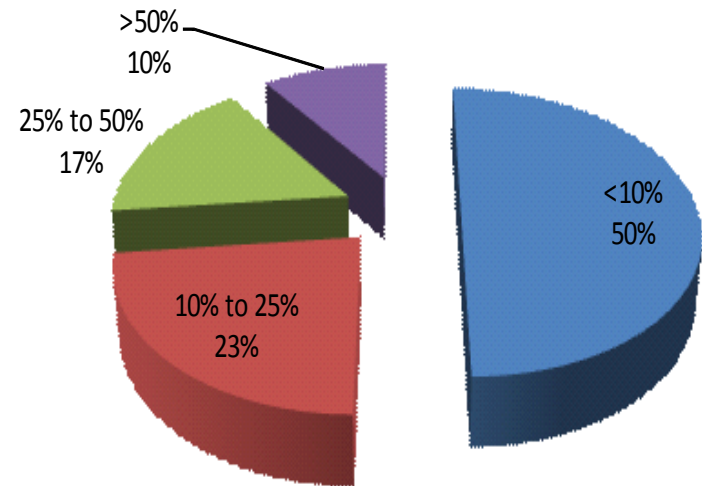
In what level do you carry out work in EO?



Average budget of each EO project



Percentage of turnover related with EO



EO services in operational User support

- During the major disaster of (August 2007) Greece initiated and profited from the **International Charter and Major Disasters** program.
- The **General Secretariat for Civil Protection** acquired **VHSR EO data** over entire **Greece** and produced vector based thematic products that are available via its web-site.
- The regional **Civil Protection Authorities** exploit **EO data** and space based related thematic products to supporting their **disaster management systems** (floods and fires) at local level.
- The **Ministry of Agricultural development and Food** has been exploiting **EO data** on a routine basis for monitoring **agricultural activities and farmer subsidies** yearly.
- The **Directorate General of Forest and Natural Environment Protection Service** of the Ministry Agricultural development and Food, participates in projects **ESA/GSE RISK-EOS**, and **SAFER** for **monitoring and mapping routinely the changes** at country level of Forest ecosystems due to wild fires.
- **Min. of Environment** profited from the **GLOBWETLAND DUE** project in the period 2003-06.

EO services in operational User support

- The Institute for Space Applications and Remote Sensing of NOA is nominated by LinkER EC as National Focal Point for disseminating GMES Core Services.
- Several institutional organisations including the Ministry of Development, Ministry of Public Works, National Cadastral Organisation, AGROGH SA, OPEKEPE have implemented operationally EO technology to respond to following needs:
 - Implementation of the CORINE (CLC2000) and CLC-Change projects.
 - Implementation of the CAP directives relating to systems as LPIS, Olive and Vineyards Registers, Best Practices for Good Agricultural and Environmental Conditions Practices.
 - The update of topographic and general use maps of 1:50.000.
 - The update of the 1:5000 series ortho-photo maps in the entirety of Greece's territory.

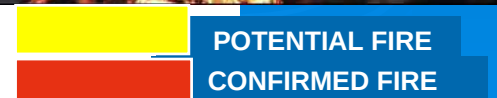
Observing capabilities



Regional Real Time Fire Monitoring – NOAA SEVIRI Receiving Stations

EMERGENCY SITUATION

SEVIRI MIR 070823_1030 UTC



Needs

- **Need for certified procedures and standards** in order to accept EO data and services in every day operations. The problem is more vital in the field of crisis management. Nowadays the problem is addressed through **LinkER and SAFER** EC/ESA GMES projects, based on previous experience of RISK-EOS, PREVIEW, RESPOND, BOSS4GMES, TERRAFIRMA.
- **Need of public funds** to sustain further the EO services development and continuation of validated operational services.
- **Need of public support** to strengthen the engagement of Greece to European Space Agency and EC GMES related Programs.

Needs

- **Need for establishing an organised network** of nominated focal points for the dissemination of EO based products and services all over Greece and exchanging technical knowledge among Greek Public Authorities, Universities and Private entities.
- **Need to support the continuous training** and enhance awareness of the End Users for exploiting space and space related investments, as many of them have proven to be unique solutions for meeting operational requirements.
- **Need of coordination at national level** for:
 - Avoiding unnecessary repetitions in man effort and money investment.
 - Organisation of decentralised web data-bases and web based dissemination services.
 - Stimulate the production of high level products.

General conclusions

- The Greek EO community follow closely the European evolutions in the domain, especially during the last 5-7 years.
- Good success stories are reported, but the fragmentation of the EO community is still an issue and the need for coordination of efforts at national level a strong requirement.