

Vegetation Fire and Smoke Pollution Warning and Advisory System (VFSP-WAS)

WEATHER CLIMATE WATER
TEMPS CLIMAT EAU

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Mangeon, William de Groot, Dodo Gunawan, Christopher Gan,
Jakarta workshop participants and GAW APP SAG members



WMO OMM

World Meteorological Organization
Organisation météorologique mondiale



2017 IBBI Workshop • 10-11 July 2017 • Boulder, CO, USA





WMO GAW-WWRP activities related IBBI



- Prediction of Vegetation Fire & Smoke Pollution as priority
- WMO GAW is one of the co-founders of IBBI
- Joint WMO-IBBI Workshop in Jakarta, Indonesia, 2016
- Vegetation Fire and Smoke Pollution Warning and Advisory System
- Joint IBBI-WMO plan for further studies to be discussed





GAW

Modelling Applications SAG

- **SAG contributes to enhancing exchanges between the GAW community and different end-user and modeling communities requested atmospheric composition data, especially for near-real-time data applications on regional to global scales.**
- ***Possible Focus Area on the Arctic as a joint study with YOPP, PACES and AMAP ??***

Science Advisory Group members:

Vincent-Henri Peuch, co-chair, ECMWF, UK

Frank Dentener, co-chair, JRC, HTAP, Italy

Arlindo Da Silva, NASA, USA

Georg Grell, NOAA, USA

Mathew Hort, Met Office, UK

Michaela Hegglin, UniReading, UK

Michail Sofiev, FMI, Finland

Paul Makar, ECCC, Canada

Taichu Tanaka, Japan, ICAP

Zhou Chunhong, CMA, China

Alexander Baklanov - WMO Secretariat representative

Ex-officio from other SAGs:

Greg Carmichael, Iowa Uni, USA – Chair
GAW SSC

Angela Benedetti, ECMWF – SDS-WAS

Gelsomina Pappalardo, Italy - Aerosol SAG

Johannes Kaiser, MPIC, Germany - IBBI

Veronique Boucher, ECCC, Canada - GURME
SAG

Valerie Thouret, France - RG SAG

Alex Vermeulen, Sweden - GHG SAG

Forecasting Emissions from Vegetation Fires and their Impacts on Human Health and Security in South East Asia

International workshop organized by the World Meteorological Organisation (WMO) and the International Biomass Burning Initiative (IBBI)

Supported by the WMO, UNISDR/IWPM, GIZ, IGAC, UNU, the Global Wildland Fire Network and Indonesian Agency for Meteorological, Climatology and Geophysics (BMKG), Jakarta, Indonesia

29 August – 1 September 2016

GOALS OF THE WORKSHOP:

1. Share experience and knowledge between SE Asian and international scientists, national agencies and practitioners on the underlying reasons, meteorological, environmental and human health impacts of vegetation fires and smoke pollution.
2. Provide initial overview of the tools for forecasting and train personnel of responsible agencies in forecasting vegetation fire smoke emissions, transport, air quality and impact on human health.
3. Explore the interest and feasibility in setting up Regional Facilities that can assist WMO Members in the region in forecasting vegetation fire smoke emissions, its transport, pollution and impacts and to evaluate the capacity of countries in the area in supporting/providing such facilities.

Outcomes from the Jakarta Workshop

- Arising from the keen interest of WMO Members in several impacted regions, the note provides guidance for addressing the issues of vegetation fire and smoke pollution.
- It also proposes the establishment of a Vegetation Fire and Smoke Pollution Warning and Advisory System (VFSP-WAS) and to support the potential foundation of regional centers on the topic.



WEATHER CLIMATE WATER

GAW Report No. 235

Draft version is available on:

http://www.wmo.int/pages/prog/arep/gaw/documents/Draft_GAW_235.pdf

Vegetation Fire and Smoke Pollution
Warning and Advisory System
(VFSP-WAS): Concept Note and
Expert Recommendations

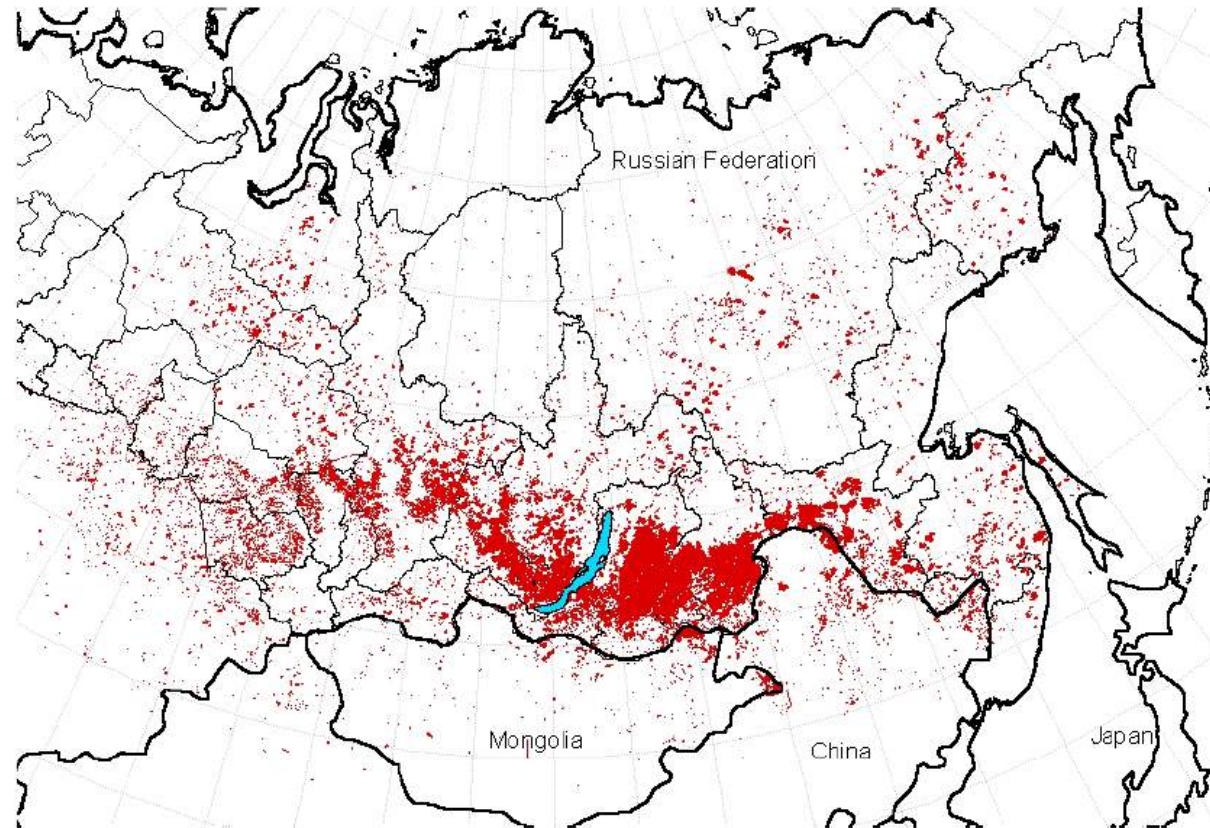


Vegetation Fire and Smoke Pollution Warning and Advisory System (VFSP-WAS): Concept Note and Expert Recommendations

GAW Report No. 235

Vegetation Fire and Smoke Pollution
Warning and Advisory System
(VFSP-WAS): Concept Note and
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WEATHER CLIMATE WATER

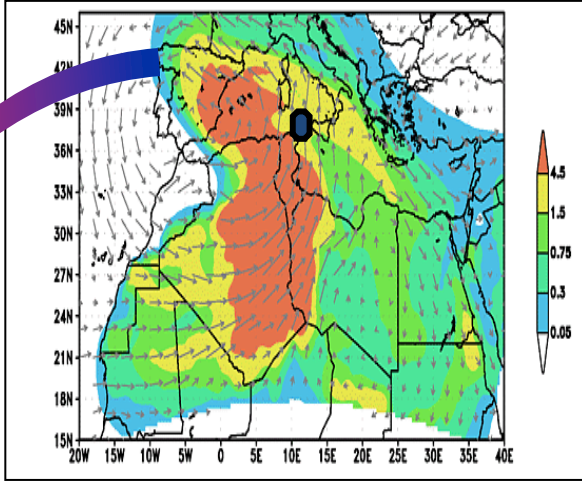


Areas of vegetation fire in Asian Russia

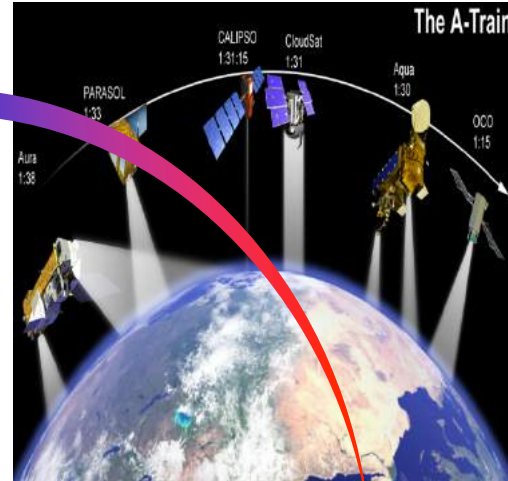


World Meteorological Organization

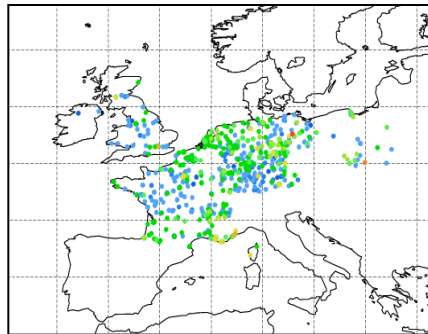
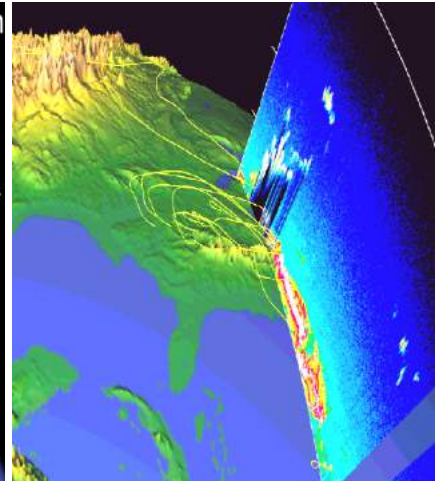
WMO Sand and Dust Storm Warning Advisory and Assessment System (SDS-WAS)



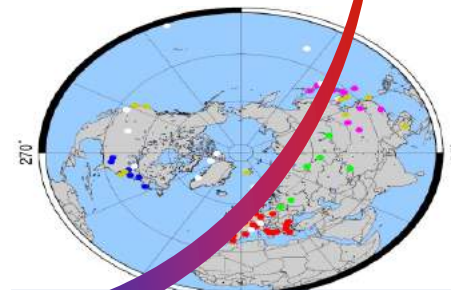
Forecast Models



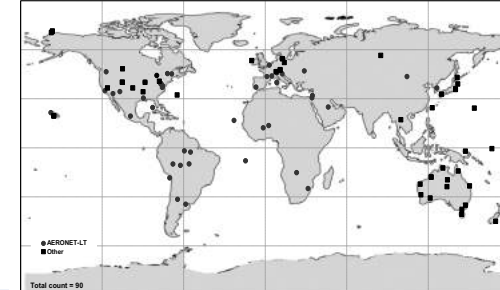
NASA A-Train MODIS CALIPSO & Geostationary Satellite IR Obs



European PM10



GALION Surface-based LIDAR



GAW/AERONET/SKYNET Surface-based AOD



WMO OMI

Dust Storms: SDS-WAS Dissemination



WMO AIRBORNE DUST BULLETIN

Sand and Dust Storm
Warning Advisory and Assessment System

نظام الإنذار بالعواصف الرملية والترابية وتقييمها
التابع للمنظمة (WMO)
نشرة التراب الجوي
للمنظمة العالمية للأرصاد الجوية

No. 1 | February 2017



BULLETIN DE L'OMM SUR LES POUSSIÈRES ATMOSPHÉRIQUES

Système d'alerte, d'avis et d'évaluation concernant
les tempêtes de sable et de poussière



WMO 浮尘公报

沙尘暴预警咨询和评估系统

En: https://library.wmo.int/opac/index.php?lvl=bulletin_display&id=3902

Fr: https://library.wmo.int/opac/index.php?lvl=notice_display&id=19879

Ar: https://library.wmo.int/opac/index.php?lvl=notice_display&id=19881

Zh: https://library.wmo.int/opac/index.php?lvl=notice_display&id=19883

WMO SDS-WAS web-sites and reports:

<http://www.wmo.int/sdswas>

<https://public.wmo.int/en/our-mandate/focus-areas/environment/sand-and-dust-storm>

SDS-WAS Regional Nodes and Operational Forecasts:

for Northern Africa, Middle East and Europe: <http://sds-was.aemet.es>;

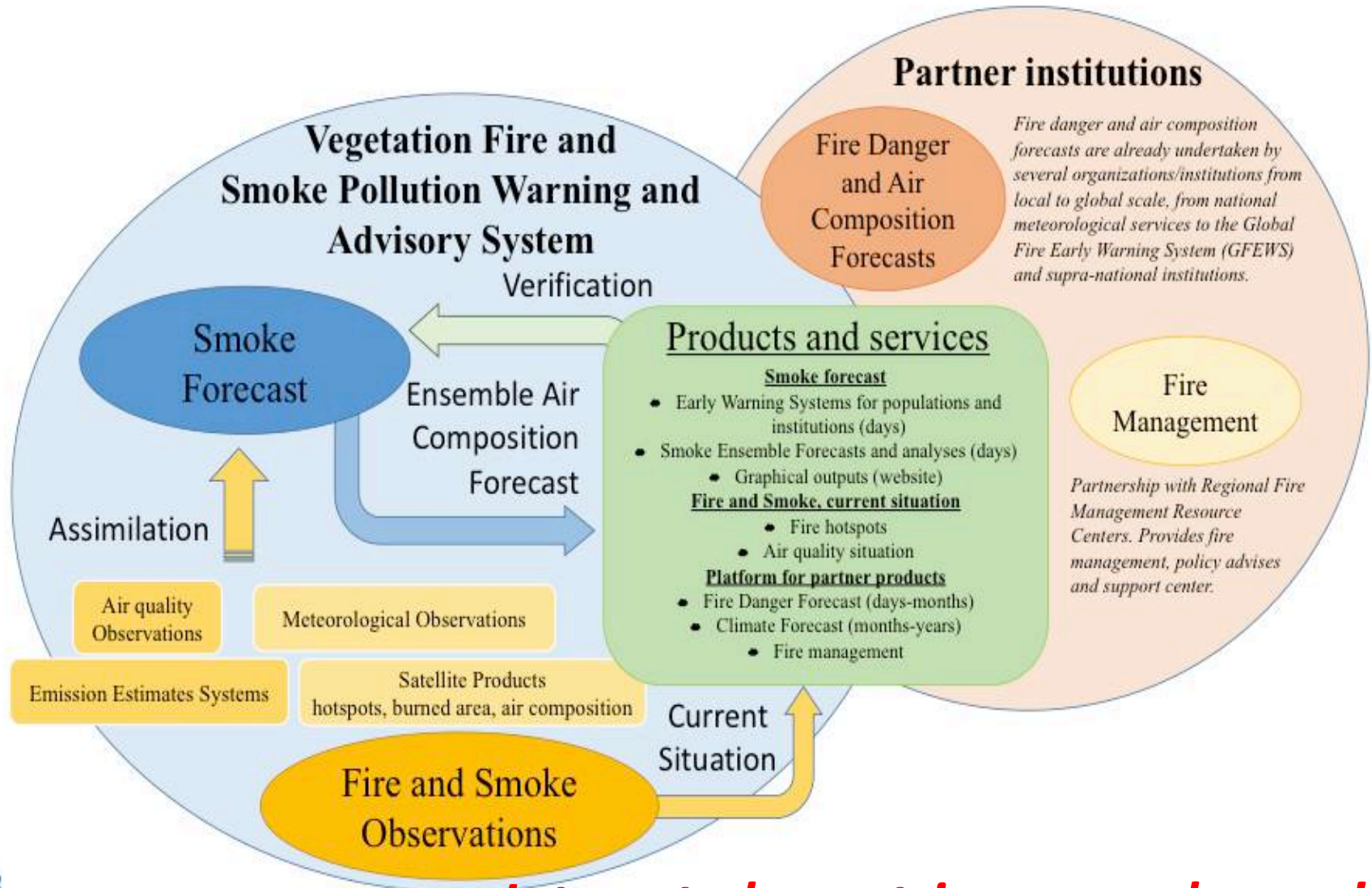
for Asia: http://eng.nmc.cn/sds_was.asian_rc;

for the Americas: <http://sds-was.cimh.edu.bb/>

Operational Barcelona Center: <http://dust.aemet.es/>



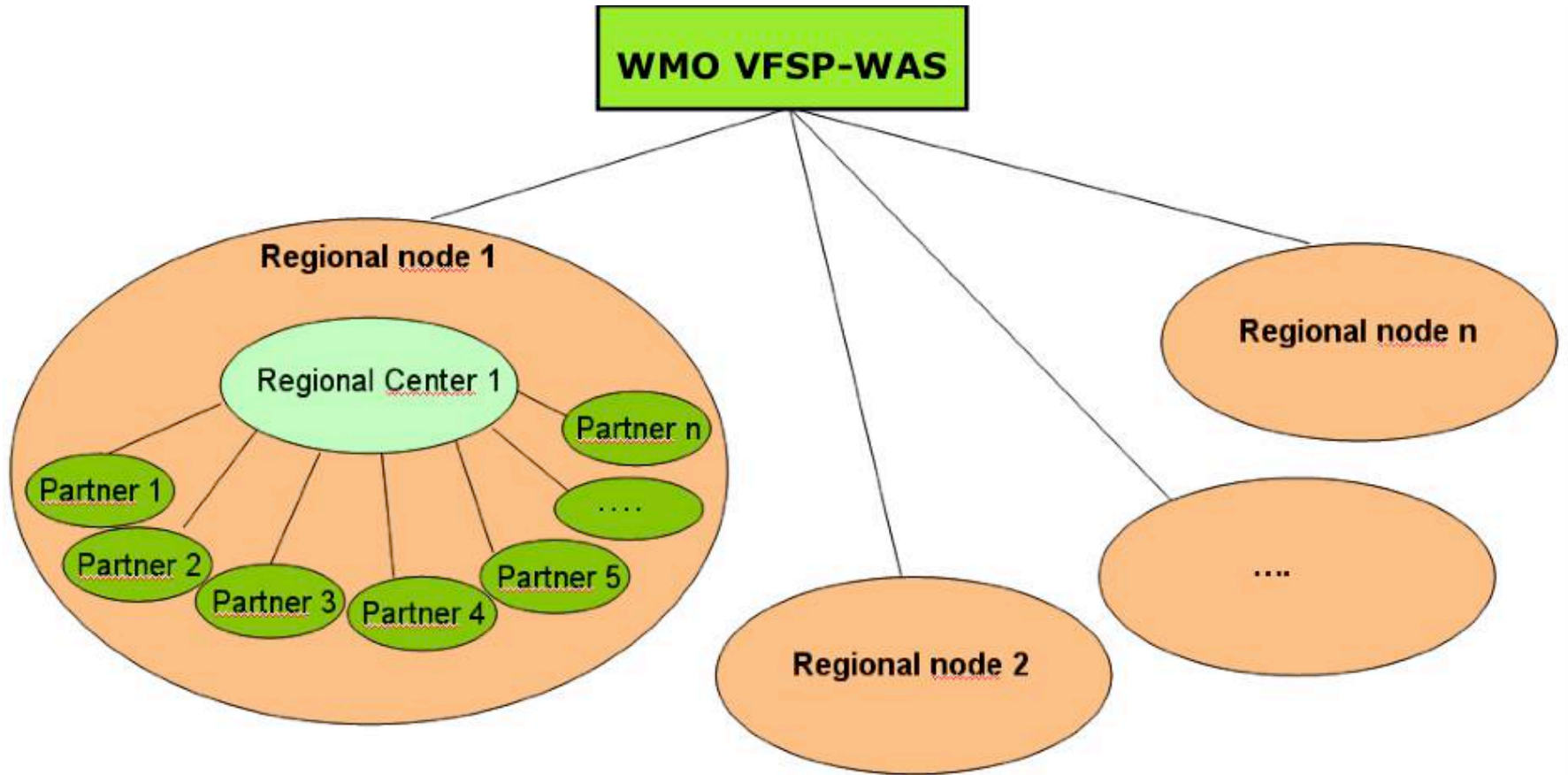
Overview of a potential Vegetation Fire and Smoke Pollution Warning and Advisory System



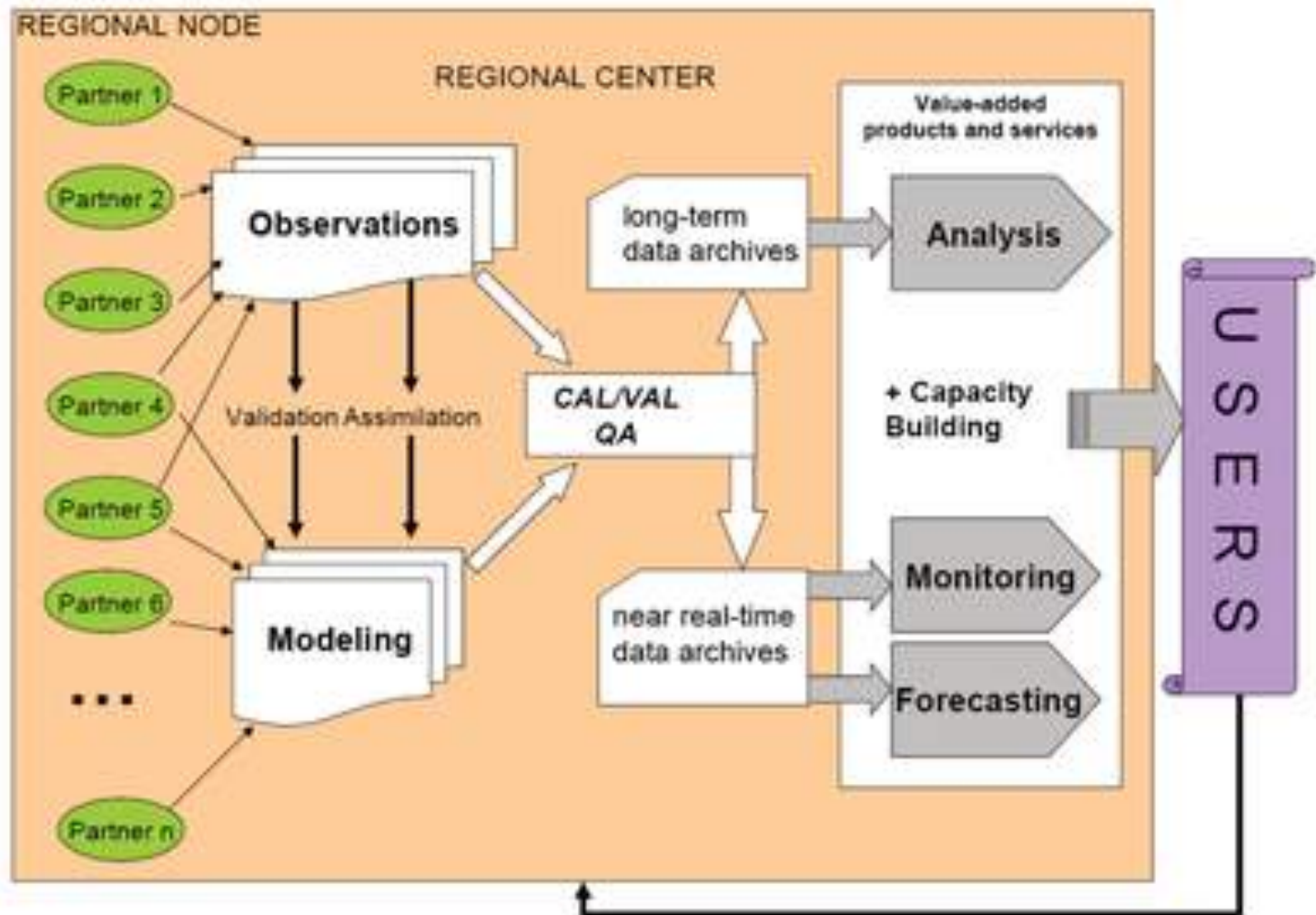
Interested countries are welcome !



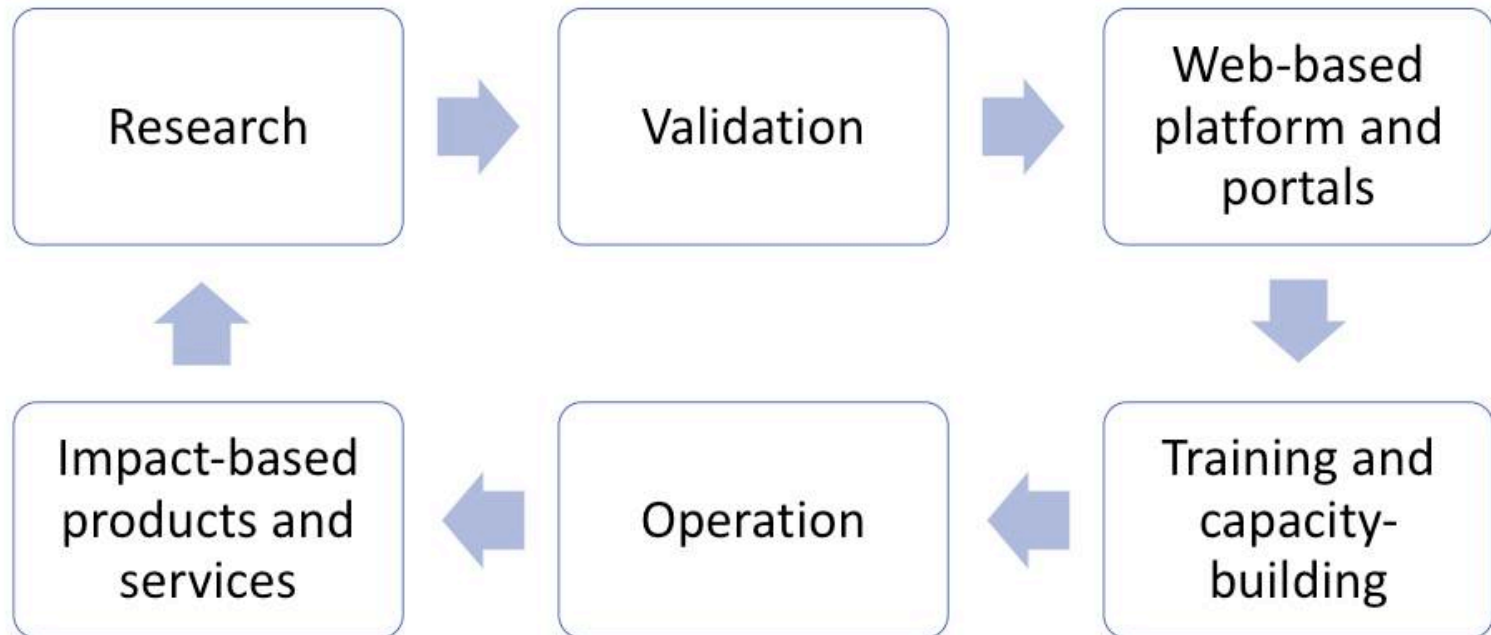
Suggested structure of the Vegetation Fire and Smoke Pollution Warning and Advisory System



Schematic structure of a WMO Regional Node and Fire and Smoke Pollution Warning and Advisory Center (RVFSP-WAC)



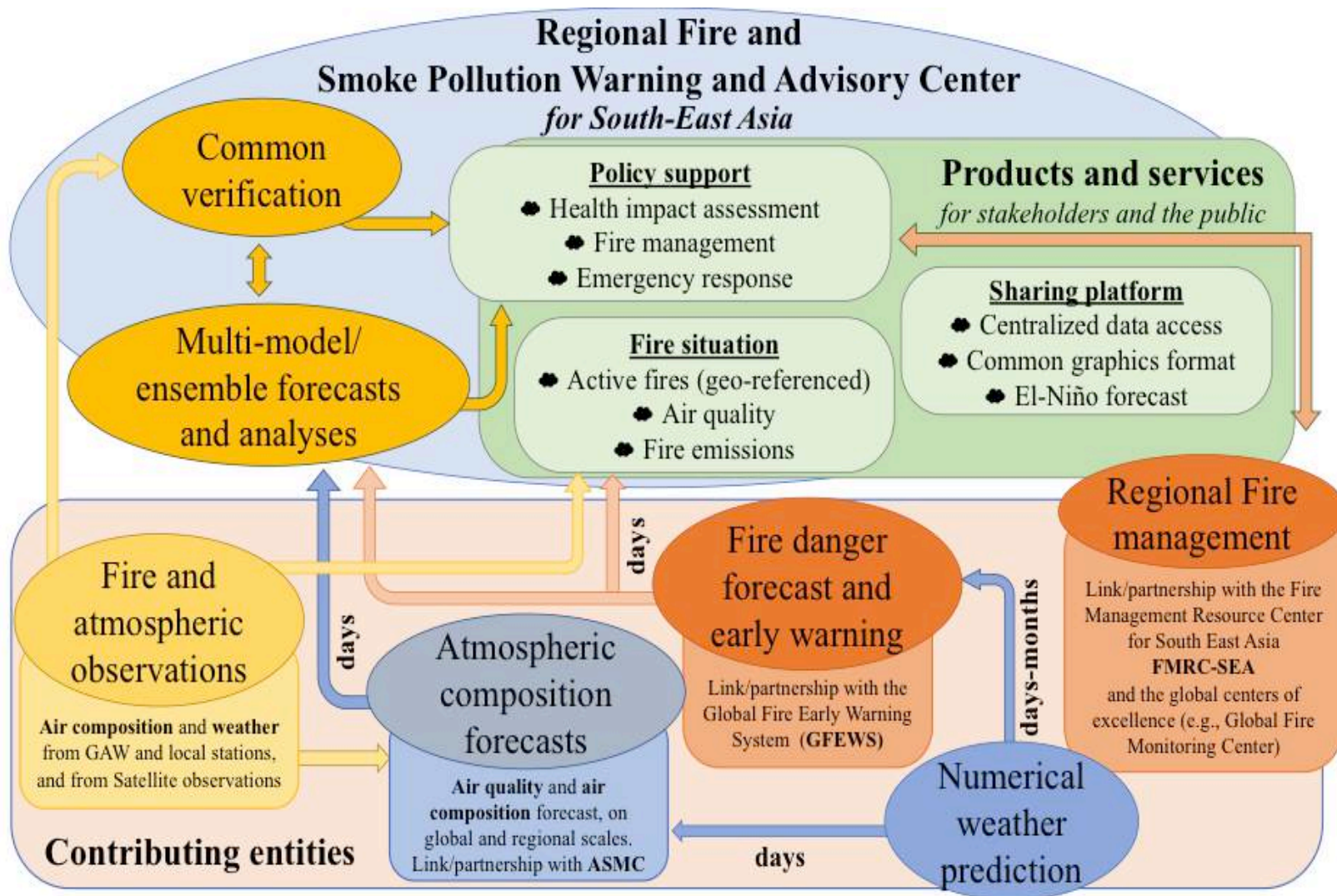
A conceptual series of steps to the implementation of a Regional Vegetation Fire and Smoke Pollution Warning and Advisory Center



Once a step is completed, attention should be maintained on the preceding ones to ensure sustained improvement and applicability



Workflow of a potential Regional Fire and Smoke Pollution Warning and Advisory Center: Example for South-East Asia

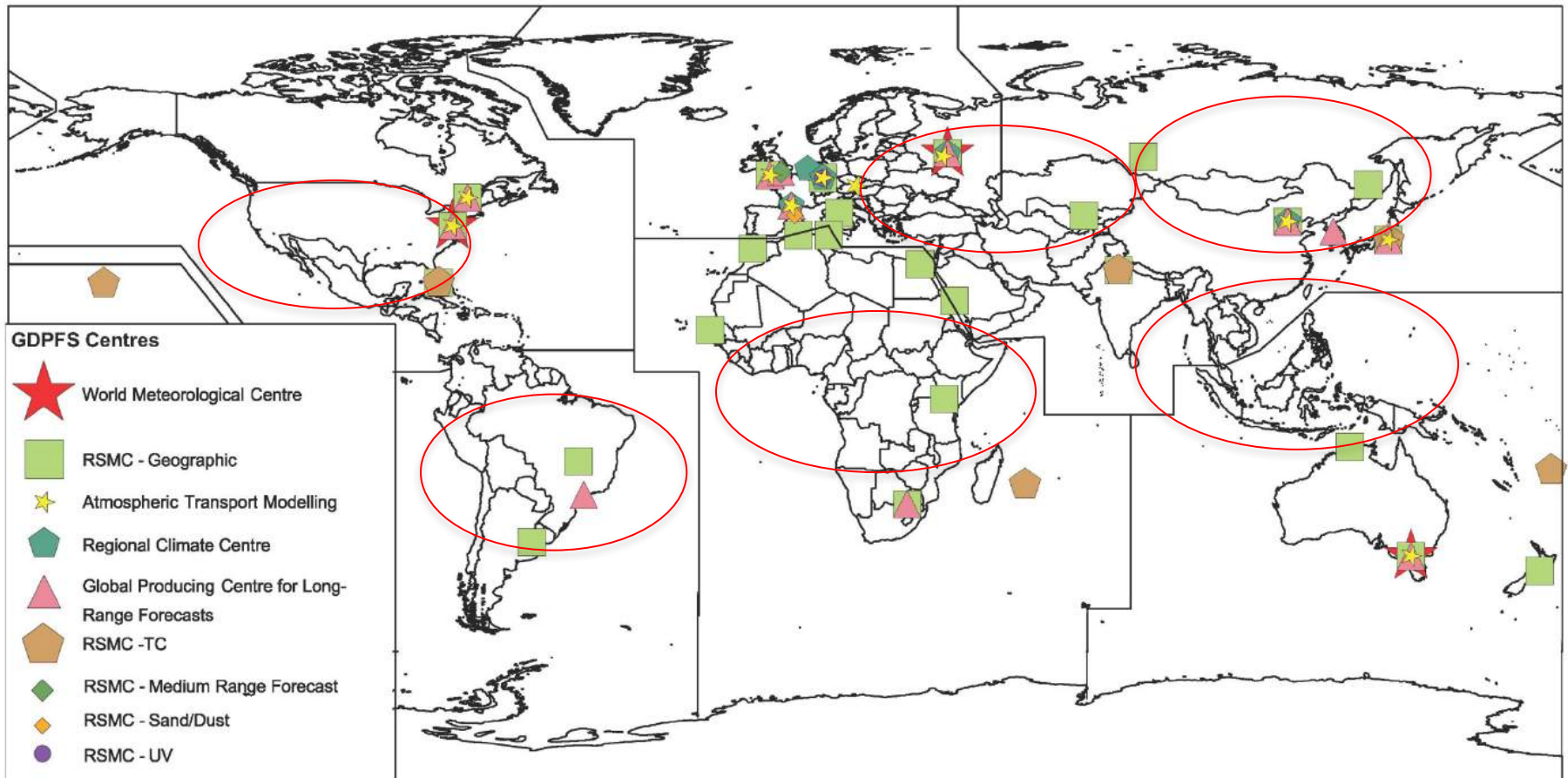


Global Data-processing and Forecasting System (GDPFS)

- Central activity/delivery mechanism of the Commission for Basic System
 - CBS: Operational arm of WMO
 - WIS and WIGOS are part of the infrastructure that support the GDPFS
- Main objective: Enabling worldwide use of timely, reliable and accurate Numerical Weather Prediction (NWP) products and services in all time-scales for applications related to weather, climate, water and environment.
 - The GDPFS is the *world-wide network of operational centres* operated by WMO Members



GDPFS and potential VFSP-WAS regional centers



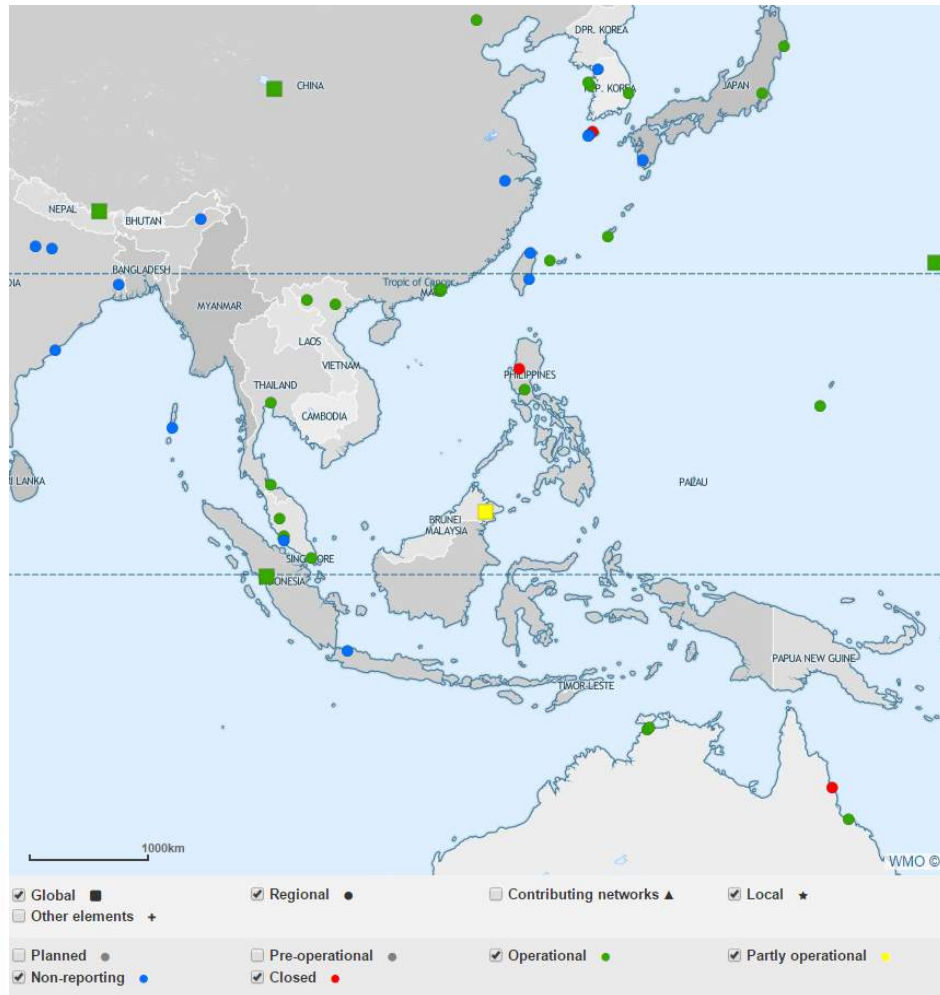
TOPIC SPECIFIC RECOMMENDATIONS

- Fire danger and seasonal forecast
 - *S2S project*
 - *ECMWF/Copernicus service*
- Fire emissions and haze forecast
 - *Fire Radiative Power*
 - *Smoke detection*
 - *Burnt area*
 - *CAMS global forecast and regional downscaling*
- Observations and data production for verification and assimilation
 - *GAW and other observations for verification*
 - *NRT data for assimilation*
 - *GALION with Lidar and ceilometer observations*
 - *Satellite new data and retrievals*
 - *Low-cost sensors applicability?*

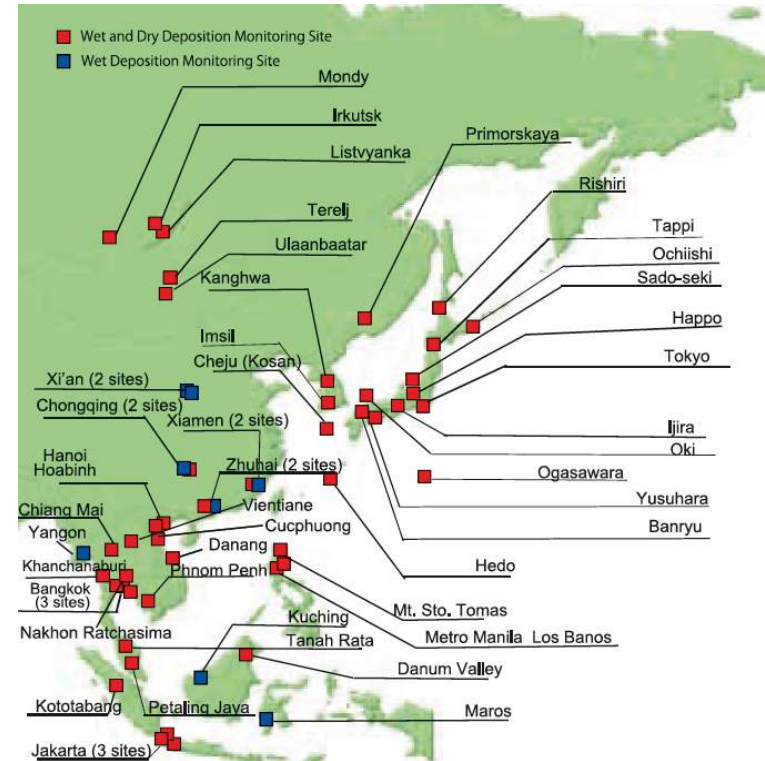


Air Pollution Observations in the Region

WMO Global Atmosphere Watch (GAW) observations in the ASEAN region



EANET monitoring sites



- Little observations exist in the region
- Existing do not share data timely
- Gaps can be filled by EANET
- => but EANET is not a contributing network to WMO GAW

WMO/GAW Aerosol Measurement Procedures,
Guidelines and Recommendations

2nd Edition
2016

http://www.wmo-gaw-sag-aerosol.org/files/FINAL_GAW_227.pdf

GAW Observations

- Stratospheric Ozone and vertical ozone distribution
- Greenhouse Gases (CO_2 and its isotopes, CH_4 and its isotopes, N_2/O_2 ratio, N_2O , SF_6 , CFCs and substitutes)
- Reactive Gases (O_3 , CO , VOCs, NO_x , SO_2)
- Atmospheric Deposition and Precipitation Chemistry
- **Aerosols (chemical and physical properties, AOD)**
- UV Radiation
- GAW Urban Meteorology and Environment (GURME) project
- GAW Modelling Applications SAG
- GAW co-sponsors GESAMP



WORLD
METEOROLOGICAL
ORGANIZATION

WMO-No. 1177



GLOBAL
ATMOSPHERE
WATCH



public.wmo.int/gaw

NO. 2 – JUNE 2016

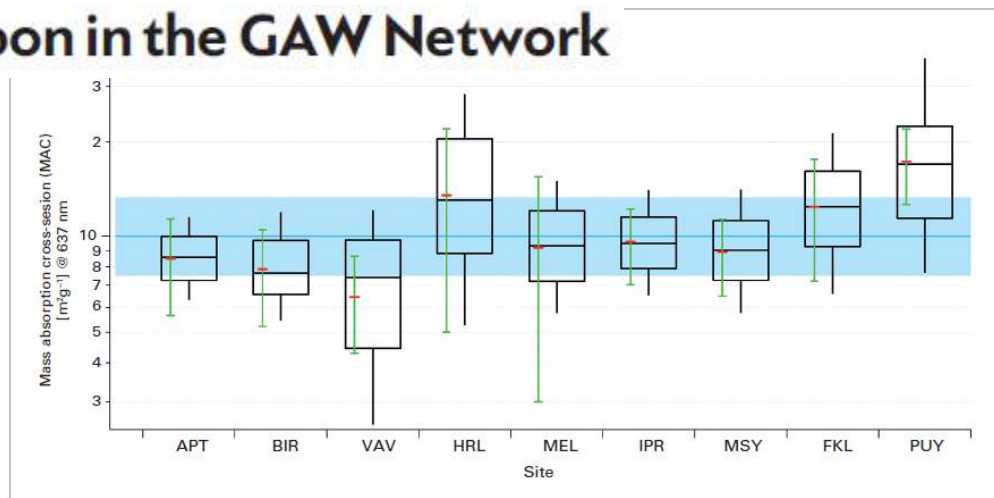
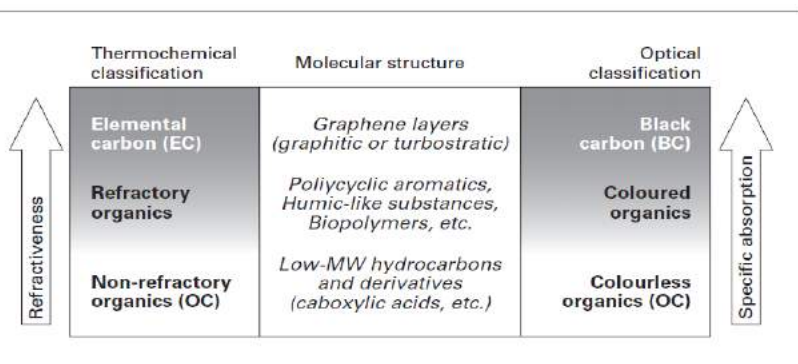
WMO AEROSOL BULLETIN

INTEGRATED OBSERVATIONS OF ATMOSPHERIC AEROSOLS

The Role of Black Carbon in Atmospheric and Climate Research

https://library.wmo.int/pmb_ged/aerosol-bulletin_2016-2_en.pdf

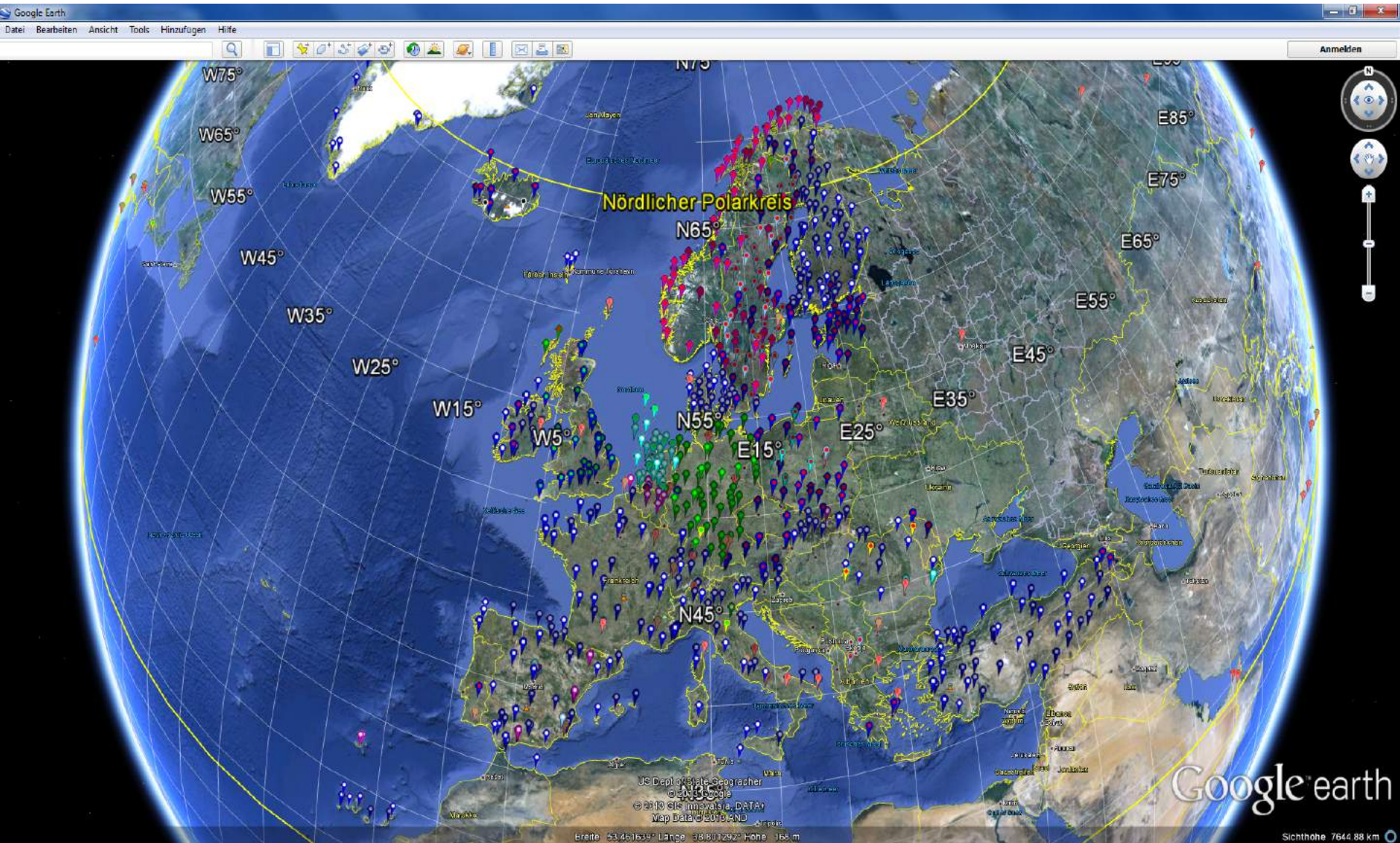
Measuring Black Carbon in the GAW Network



Some questions and suggestions

- Modelling exercise within APP SAG for these US Field Campaigns
- GAW APP SAG Contacts: Pablo Saide, Johannes Kaiser, Arlindo da Silva, Greg Carmichael, Gorg Grell, Paul Makar, Mikhail Sofiev,
- GFAS and Ensemble model forecasting: building and evaluation for specific regions
- Seasonal forecast of fire danger meteorological conditions
- «Last mile»: how to reach potential users on time and in proper form (Impact based prediction)?
- What regions are the most important for VFSP-WAS?

Ceilometers network (assessment by Werner Thomas, DWD)





GAW

Low Cost Sensor – Activities

(Possible tests for wild fires pollution?)



- **Some highlights:**
- **Citizens will use more and more sensors. Professionals should be prepared for this. Clear communication is key.**
- **There is an urgent need for sharing information on the available sensor tests, calibration practices and algorithms.**
- **Sensor calibrations pose impressive challenges.**
- **Everyone agreed: we should promote and stimulate open (calibration) systems.**
- **Sensors can benefit from embedding in AQ model systems. Though this requires quite some (model) work.**
- **Is a niche available for sensors in combination with models?**
- **A European community is desirable. The concept of FAIRMODE can serve as an example.**
- **We should discuss the possibility of a sensor community with FAIRMODE, AQUILA and CEN communities.**

Thanks!



**We are open for
collaboration with
IBBI!**

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