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TITLE:

GMES SERVICE ELEMENT

PROMOTE

U8 Core User Group Executive Report
Version 2

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EXECUTIVE SUMMARY

This document provides the collective assessment of the PROMOTE services portfolio by the Core Users involved in the project during the second half of the project. The information contained within is of two types. The first is a summary of the evaluations contained in U7: Service Utility Report; the second are comments received in the evaluations by Core Users which did not meet the requirements of ESA in the SoW in the sense that the services and products were actively utilized within the Core User organisations, and were thus not included in U7.

Of the four thematic areas covered by the PROMOTE portfolio, three have products which have satisfied users currently using the products: Stratospheric Ozone (RIVM, ECMWF, SPARC-CCMVal), Surface UV Radiation (BVDD, ARPA-Tuscany, ARPA-Sicily), and Air Quality (EMPA, LUA, London Borough of Croydon, UBA-Austria, NILU). From the evaluations received during the course of the project, there are, however, additional users who are currently testing the utility of PROMOTE products or who see promise in them and would evaluate their utility if funding and time allowed.

The fourth thematic area represented in the PROMOTE portfolio is Greenhouse Gases and Aerosols. This service is made up of demonstration products and there were no Core Users that felt that evaluation was yet worthwhile, despite interest in future improved/operation services.

An important note: this second version of U8 should **not** be seen as superseding the first version. Because the information contained in each version was based on two different evaluations, the two versions should be seen as complimentary and any assessment of PROMOTE should be based on both versions.

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CHANGE RECORD

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1. INTRODUCTION

1.1 Purpose

This report summarizes the second of two formal assessments of the PROMOTE services by the Core Users involved in the project. There were some Core Users who joined the project during its second half, and additionally, there were some products added to the portfolio. Thus, this report reflects the fact that some Core Users were using the products in the service portfolio for the first time when they made their evaluations. In other cases, the Core Users had several months to utilize and assess the services.

This report should, however, provide an excellent starting point for outsiders assessing the PROMOTE portfolio and the real or potential impact the services can have on User organisations.

1.2 Scope

This document is part of the Task2: Service Portfolio Construction and Delivery task of PROMOTE, and summarizes the reactions of the Core Users to the products within the project portfolio. In a majority of cases, the comments provided by the Core Users were based on preliminary exposure to and use of the service and as such, it was too early for them to document case studies and impact analysis of operations, reports, forecasts, and policy decisions applicable to their organisations. There were, however, several case studies performed. These are presented in their entirety in U7 [AD2] and summarised in this document.

1.3 References

1.3.1 Applicable Documents


- [AD1] Statement of Work, Service Consolidation Actions of EARTHWATCH GMES Services Element, EOEP-GSE-EOAD-SW-02-0002, Issue 6.4, Sep-10, 2002.
- [AD2] U8: Service Utility Report (Version 1) of the GSE Project PROMOTE. Project document REF# PROMOTE-008.

1.3.2 Reference Documents

There are no reference documents included at this time.

1.4 Document Overview

On a service-by-service basis, the chapters which follow provide a summary of Core User reactions to the PROMOTE portfolio. The summaries provided are based on inputs provided by the Core Users and included, in part, in the U7 document [AD2]. There is, however, input received for U7 but was not included there since its scope did not meet the requirements of the SoW [AD1]. The summaries seek to bring across any consistent messages on the services and products of the Stratospheric Ozone, Surface UV Radiation, and Air Quality product lines. In cases of products where there are no consistent messages, the range of assessments will be provided.

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2. STRATOSPHERIC OZONE SERVICE

This chapter provides an executive summary of the Core User evaluations of the five PROMOTE services related to stratospheric ozone. For this Phase of the project, RIVM, ECMWF, and SPARC/CCMVal provided input; each evaluated one service.

2.1 Summary of the Long-term Total Ozone Record Service Evaluation

The long term total ozone record service of PROMOTE was evaluated by RIVM in order to support their prognostic UV-scenario analysis. Specifically comparisons were made between UV estimates using the PROMOTE Ozone information and those based on in situ (ground) UV measurements. It was found that, generally, there is a good agreement between measured and modelled values with the GOME-SCIAMACHY-based modelled UV-values following nicely the ground-based ozone modelled UV-values. RIVM feels it “crucial” to have access to this service and hopes that the service can be continued and further improved with respect to easier-to-use data access and formats.

2.2 Summary of the GOMOS Ozone Profile Record Service Evaluation

The GOMOS ozone profile record was not evaluated by any of the Core Users.

2.3 Summary of the NRT Total Ozone Service Evaluation


The NRT total ozone service was utilised and evaluated by ECMWF and is used, along with SBUV/2 data from NOAA-16, to improve their ozone analysis by assimilating the PROMOTE product into their operational system. ECMWF has determined that assimilation of this product “leads to a pronounced improvement of the ECMWF ozone analysis field”. In order to improve the service, the percentage of timely deliveries would need to be increased, as currently only 40% of the data is available by the analysis cut-off times. Additionally, notification of unavailability would be seen as beneficial.

2.4 Summary of the Daily Ozone Forecast Service Evaluation

The GOMOS ozone profile record was not evaluated by any of the Core Users. It is, however, important to note that this service is used internally within PROMOTE as an input in the Surface UV Radiation portfolio and as such should be considered a valuable service.

2.5 Summary of the Assimilated Stratospheric Ozone Service Evaluation

The assimilated stratospheric ozone service was evaluated by the CCM validation activity of the SPARC project (SPARC-CCMVal) where this service was used to make

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an assessment of the performance of a coupled-chemistry climate model, ECHAM4.L39(DLR)/CHEM via comparisons with the PROMOTE product. Although the number of years of data available from the PROMOTE service was too limited to make a full assessment of the model under study, the Core User team from SPARC/CCMVal was able to satisfactorily assess the representativeness of the model output based on the comparisons. There are several recommendations made on the service in order to improve its utility to the Core User for this application, but overall this service is seen as very important to the modelling community and it is hoped that a longer-term, quality assured and validated time series can be made available.

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3. SURFACE UV RADIATION SERVICE UTILITY REPORT

This chapter provides an executive summary of the Core User evaluations of the PROMOTE services related to surface UV radiation. The four Core Users that provided input were: the Agency for the Protection of the Environment-Sicily (**ARPA-S**), the Agency for the Protection of the Environment-Tuscany (**ARPA-T**), the Association of German Dermatologists (**BVDD**), and the Finnish Environmental Institute (**SYKE**).

3.1 Summary of the UV Monitoring and Record Service Evaluation

This service was evaluated by SYKE on behalf of the Finnish Environmental Administration which provided information on its data needs related to surface UV radiation. Based on the limited coverage of ground-based data sources of surface UV radiation, a satellite-based service such as that offered in PROMOTE is seen as a means for establishing a nation-wide monitoring service. This is regarded as valuable especially for applications related to the aquatic environment of Finland, especially if the service was extended to include additional action spectra (or spectrally resolved data).

The BVDD mentioned in its assessments that long-term time series of UV information might have potential to be used to monitor and better understand skin cancer incidents; in essence for epidemiological studies.

No further comments were received from BVDD regarding this neither service nor knowledge of plans for such utilization.

Please note: Comments collected during the Phase I of the project are still considered noteworthy and the reader is directed to [AD2].


3.2 Summary of the UV Forecasting Service Evaluation

None of the Core Users provided an evaluation of the UV Forecasting Service.

3.3 Summary of the UV Sunburn-time Forecast Service Evaluation

ARPA-S, ARPA-T, and BVDD provided evaluations of the Sunburn-time Forecast Service. In this Phase of the project, there were two products offered: UV-Check, a European-wide service also offered in Phase I, and MEDSUN, a service focusing on two regions in Italy and added during Phase II.

The two ARPAs (Sicily and Tuscany) were both satisfied with the MEDSUN service which helped them to, for the first time, provide citizens information related to their health and exposure to UV radiation in an easy manner. Moreover, the services provided as part of PROMOTE alleviates the need for the ARPAs to operate and maintain an extensive ground-based monitoring network in order to provide UV information. This preliminary demonstration received good feedback in the form of

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press coverage which is seen as an acknowledgment of the value of the service. Use during future summers is foreseen.

The BVDD has done an extensive assessment of UV-Check and the other UV services of PROMOTE through communications with the dermatologists in its membership. Services such as those in PROMOTE are seen as invaluable tool for dermatologists to use to communicate on the topic of skin cancer with their patients and the public at large, as well as to monitor long-term UV trends as they relate to skin cancer incidents. BVDD recognizes and highlights the importance of promoting the PROMOTE UV services so that they can be utilized by the widest possible number of users.

Please note: Comments collected during the Phase I of the project are still considered noteworthy and the reader is directed to [AD2].

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4. AIR QUALITY SERVICE UTILITY REPORT

This chapter provides an executive summary of the Core User evaluations of the PROMOTE services related to Air Quality. The Core Users that provided input were: the Agency for the Protection of the Environment-Lombardia (**ARPA-L**), Agency for the Protection of the Environment-Piemonte (**ARPA-P**), the Swiss Federal Laboratories for Materials Testing and Research (**EMPA**), the Irish Environmental Protection Agency (**EPA**), the London Borough of Croydon (**LBC**), the North Rhine-Westphalia State Environment Agency (**LUA**), Netherlands Environmental Assessment Agency (**MNP**), the Norwegian Institute for Air Research (**NILU**), the environmental agency of the Greek region of Central Macedonia (**RCM**), Dutch National Institute of Public Health and the Environment (**RIVM**), and the Federal Austrian Environmental Agency (**UBA-A**), the Flemish Institute for Technological Research (**VITO**) and the LISA-Consortium, representing (**ADEME**, **AirParif**, and **INERIS** who elected to provide their input under a single heading).

4.1 Summary of the NO₂ Monitoring Service Evaluation

Please note that this evaluation covers three different products offering information on levels of tropospheric NO₂. Please see the PROMOTE website or documentation for a full description of the three products.


Because European environmental agencies are required to monitor NO₂, existing ground-based measuring capabilities are currently being used to do so. These agencies were, however, very interested in exploring the possibility of obtaining information on NO₂ from satellites and getting a feeling for the capabilities and weaknesses of the technology.

For those environmental organisations that evaluated the potential of the PROMOTE NO₂ monitoring services, most stated that they could envision using the products to augment their reporting which is currently based on data collected from ground-based instrumentation, but that they could not envision replacing it with the satellite-based information.

For those environmental agencies that model air quality, several expressed interest in experimenting in the future with the assimilation of the NO₂ products in order to improve their modelling results or in using the monthly mean values to estimate emissions based on inverse modelling.

Several evaluations mentioned the utility of maps of NO₂ to effectively communicate the geographical distribution of the pollutant across Europe.

One Core User, EMPA, has been working to compare the NO₂ values derived from satellite data (from one of the three products) with values obtained from in situ measurements. This work is still ongoing, but preliminary results are encouraging for clear sky conditions, with larger deviations for lower levels of NO₂ and cloudy conditions. The results of this evaluation are expected to be submitted to Atmospheric Chemistry and Physics.

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Please note: Comments collected during the Phase I of the project are still considered noteworthy and the reader is directed to [AD2].

4.2 Summary of the SO₂ Monitoring Service Evaluation

The SO₂ Monitoring Service was not formally evaluated by any of the users despite the fact that a few indicated in the first evaluation of Phase I that they had plans to assess the product in Phase II of the project. No reason for this was given.

Please note: Comments collected during the Phase I of the project are still considered noteworthy and the reader is directed to [AD2].

4.3 Summary of the Aerosol Monitoring Service Evaluation

Please note that this evaluation form covers aerosol monitoring products from three sources on the PROMOTE website.

Two Core Users provided evaluations of the three products that were offered in the aerosol monitoring service and were based on utility of those services. In addition to this, several Core Users provided feedback on the service based on anecdotal experiences or expectations.


The primary interest of all the Core Users was to begin understanding what is available from satellites related to information on aerosols and to learn what the potential gain is from using such products, as well as what the limitations are.

Most respondents performed comparisons between in situ data of particulate matter with the aerosol optical depths obtained from the PROMOTE products as a first attempt to understand what the services might offer them. For those that made quantitative rather than qualitative (visual) comparisons, it was often seen that the satellite data indicated higher levels of aerosols than did the in situ data. But it was universally recognized that the spatial and, perhaps more so, the temporal resolution of the products would limit the utility for assessments of local aerosol levels. In particular the inability to capture neither the peak load times with the satellite-based products nor diurnal variations was recognized as limiting the utility of the service for local air quality assessments. However, the ability to observe levels of aerosols across entire regions and to begin to have a picture regarding sources (hotspots and trends) and transport processes was seen as a benefit of the PROMOTE aerosol service. This information was seen to be potentially useful in air quality modelling via assimilation.

Additionally, it was mentioned several times that the potentially larger benefit from this service, especially after longer time-series have been built up, would likely be found more in climate research applications than in air quality applications

All users were certain that further investigation of the utility of the PROMOTE aerosol services would be of high interest to them.

Please note: Comments collected during the Phase I of the project are still considered noteworthy and the reader is directed to [AD2].

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4.4 Summary of the Regional Air Quality Monitoring and Forecasting Services Evaluation

Please note that this evaluation covers the regional AQ monitoring and/or forecasting products from four sources on the PROMOTE website (EURAD, Prev'Air, AERES, and AUTH).

There were several distinct uses named by the Core Users in the evaluations for this set of PROMOTE products:

- 1) Use information from these models to fulfil reporting obligations on Air Quality
- 2) Use regional model results as boundary conditions for local (higher resolution) models
- 3) Use monitoring and forecasting maps as a communication tool for informing the public
- 4) Use forecast information to help make decisions on implementation of air quality improvement measures
- 5) Monitor transboundary pollution episodes

The users that sought to use this PROMOTE service for the first three reasons were satisfied and will continue to use them for those purposes. Those users that hoped to use this PROMOTE service for the last two reasons state that more time and effort will be required before it can be ascertained if they will be successful.

Almost all users, regardless of their purposes for using the PROMOTE service were involved in making comparisons between the modelled results and their in situ data. Despite validation information being available for the products, the users seemed to recognize that their unique areas, with varying topography and land use, warranted their own validation efforts.

One final note of interest is the fact that one Core User expressed the hope that in the future the models would include more assimilation of in situ and satellite data.


Please note: Comments collected during the Phase I of the project are still considered noteworthy and the reader is directed to [AD2].

4.5 Summary of the City-Level Air Quality Forecasting Service Evaluation

Please note that at this time, the city used as an example is London.

One user, the London Borough of Croydon (LBC), evaluated this service, but several other user groups stated that they would be interested in having a city of interest to them included in this service in the future.

LBC was very satisfied with this PROMOTE service since it met and responded very well to their needs and provided the first street-level air pollution forecast for Croydon

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in a highly visually engaging way, enabling the public to make real changes to daily routines to avoid exposure to air pollution and gain a better understanding of air quality at the local level.