



Progress Report
COST Action 726
***„Long term changes and
climatology
of UV radiation over Europe”***

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Presentation Outline

- Action's objectives and benefits
- Results versus objectives
- Outcomes, achievements, impact and European added-values
- Coordination and management
- Encouragement of younger scientists
- Results dissemination
- Future plans for the Action
- Recognised problems

Action's Objectives

Main objective:

- ✓ **To advance the understanding of UV radiation distribution under various meteorological conditions in Europe in order to determine UV radiation climatology and assess UV changes over Europe.**

To achieve the above goal, several practical objectives were defined.

Action's Benefits

- ✓ Geographically broader and scientifically deeper knowledge of the climatology of UV radiation and of selected biologically effective UV radiation doses across Europe.
- ✓ The main beneficiaries will be the public, researchers in atmospheric and medical sciences as well as authorities and policy makers.



Results vs. Objectives

O1: to inventory available solar radiation data sets, including UV data, spectral and broadband, ancillary data (ozone, clouds, sunshine etc.) and available satellite data.

Results:

- The available data for UV reconstruction have been recognised.
- Action's data base has been implemented and is operated by Finnish Meteorological Institute.
- The BSCW package (provided by DWD) is used for data and results access and exchange.
- The data Protocol has been agreed and has to be signed by all data-base and BSCW users.
- The data from selected six stations were made available to UV reconstruction modellers.

O1 Results cont.:

- The COST-726 reconstructed ozone dataset was created.
- The suitability of different ozone data bases (ERA-40, NIWA, COST-726) for UV reconstruction was analyzed.
- The possible sources of information about clouds (ERA-40, NCEP) that can be used in the UV reconstruction models were considered.
- The ECMWF allowed for using the high resolution ERA-40 data for COST-726 research under the agreed conditions.
- WMO WRDC has provided solar global radiation data from 2000-2001, from European stations for UV mapping experiment.



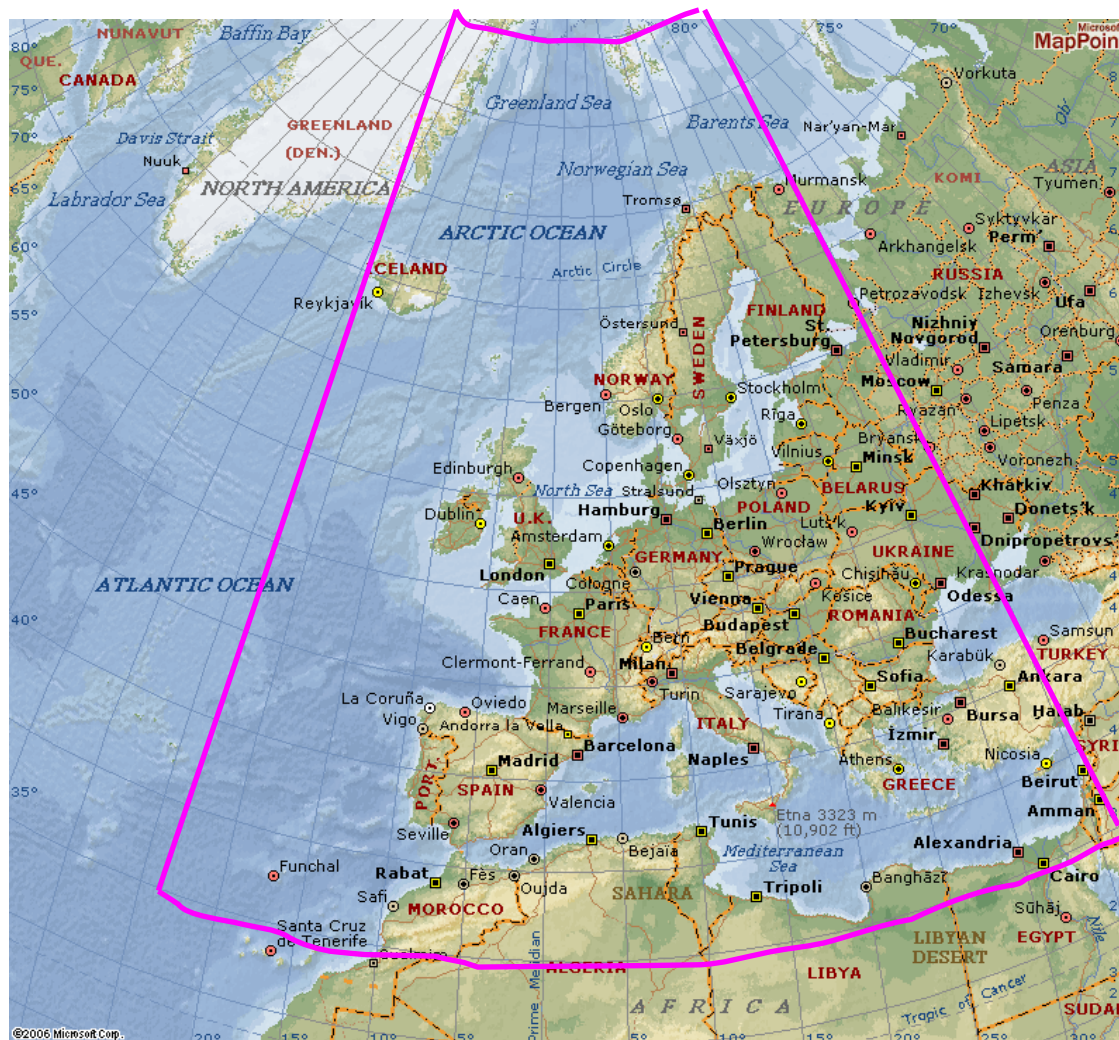
COST-726 Ozone Dataset Domain

AREA

25.625°W-35.625°E

GRID SIZE

1.25°(lon.)x1.0°(lat.)

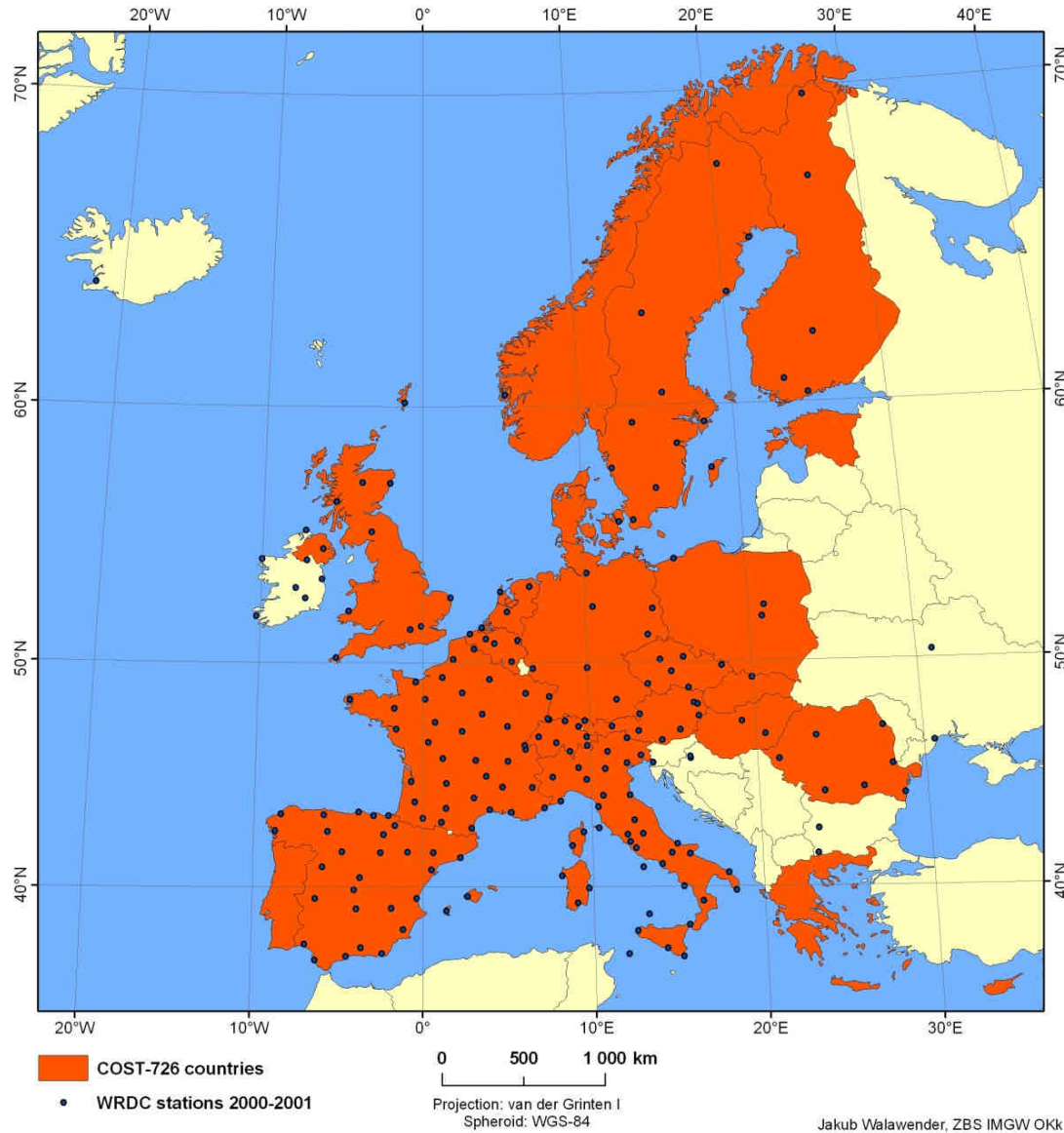


From J.Krzyscin presentation: 'Total Ozone Data Base for COST-726', www.cost726.org

DC ESSEM Meeting, 6-7 June 2007, Brussels, Belgium



WRDC Available Stations



DC ESSEM Meeting, 6-7 June 2007, Brussels, Belgium



Results vs. Objectives

O2: to advance the understanding of UV reconstruction models for the calculations of UV climatology and assessment of UV changes.

Results:

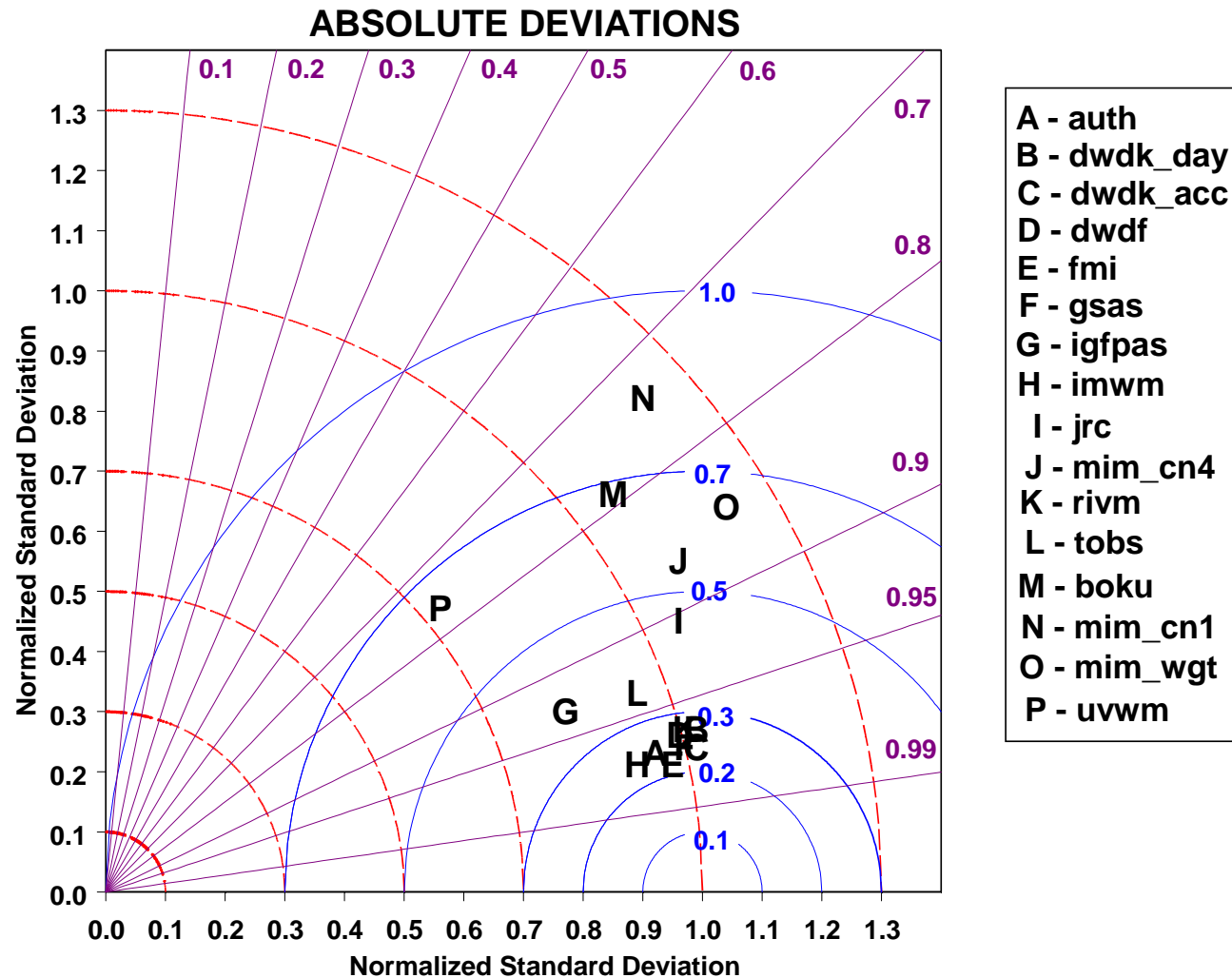
- The works concerning the UV reconstruction methodology have been completed.
 - Quality check of different algorithms and of input data for the UV reconstruction was completed.
 - Models for UV reconstruction, used in the Action countries, were identified.

O2 Results cont:

- The UV reconstruction modelling exercise has been performed, using well defined input data prepared by WG1. Thirteen WG2 members with sixteen models and algorithms took part in the exercise.
- Models, suitable for UV reconstruction for Europe, have been identified.
- The arrangements for the exercise aiming at comparing different methods for UV maps creation were made.

Modelling Exercise Results

Taylor diagram



„Modelling solar UV radiation in the past: Comparison of algorithms and input data”, P. Köpke et.al 2007,
www.cost726.org

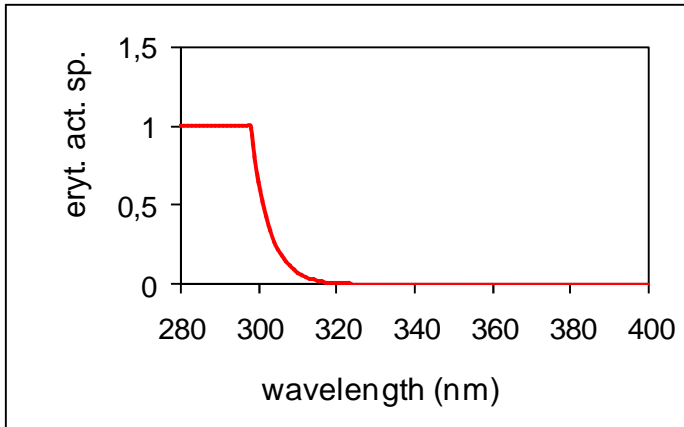
O3: to advance the understanding of biological UV radiation climatology and changes in Europe, on the basis of selected effective UV radiation doses;

Results:

- The most used action spectra in plant/ecosystems research were reviewed;
- The differences in UV Biologically Effective radiation computed according to different plant action spectra were preliminary evaluated;
- The influence of the spectral resolution on the UV integrals for different action spectra was analysed.

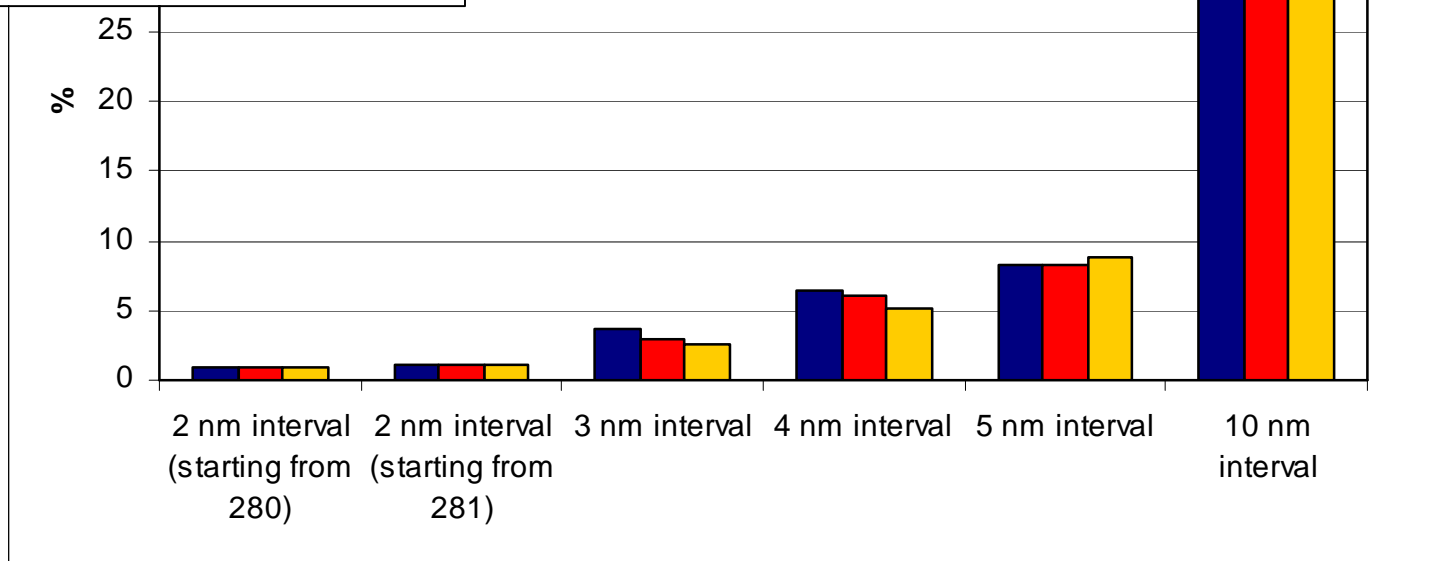
Spectral Resolution Influence

Erythema



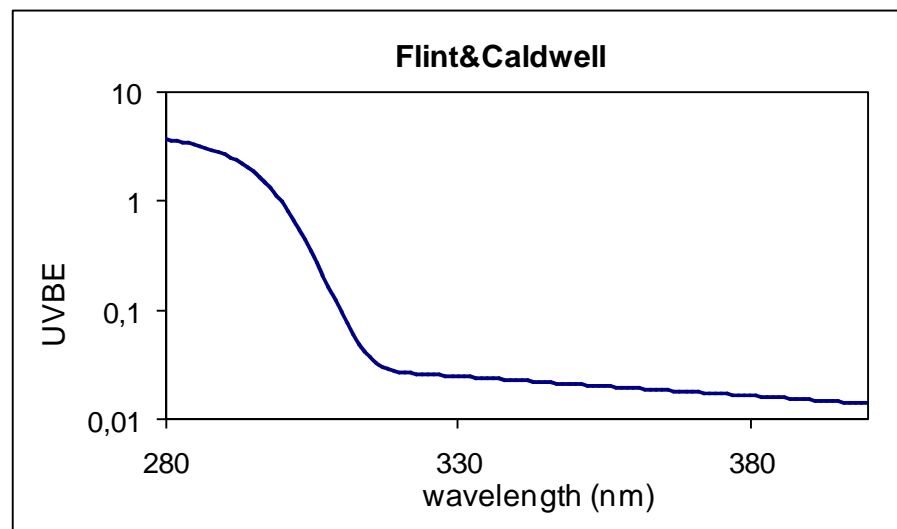
Error % (UVBE_{eryt})

- Bolgheri
- Mondeggi
- Croce Arcana

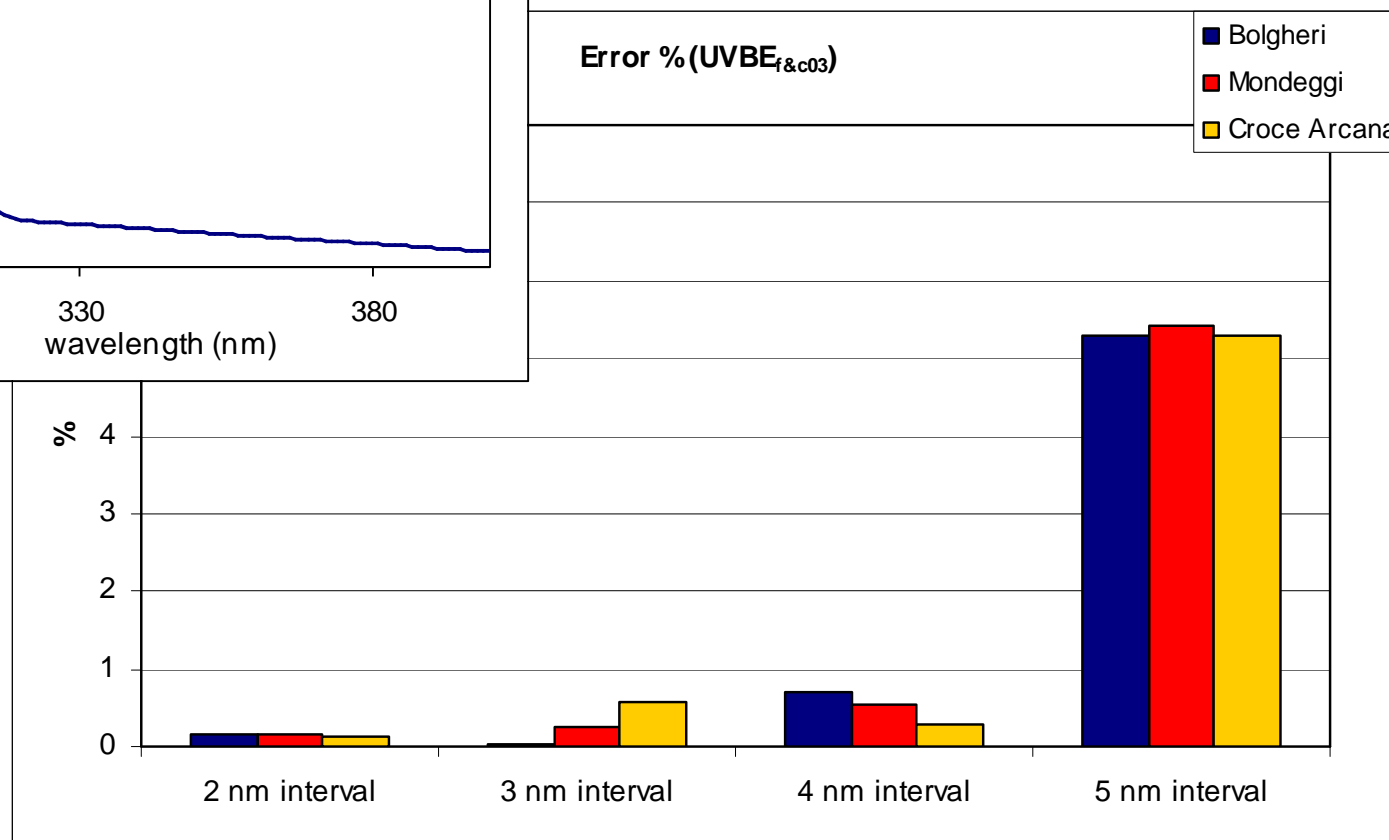


From G.Zipoli presentation: 'Errors in computing daily biologically effective UV irradiances due to spectral resolution', www.cost726.org

Spectral Resolution Influence



Vegetation



From G.Zipoli presentation: 'Errors in computing daily biologically effective UV irradiances due to spectral resolution', www.cost726.org



Results vs. Objectives

O4: to use the advanced knowledge in order to elaborate a comprehensive analysis and information basis, addressed to beneficiaries.

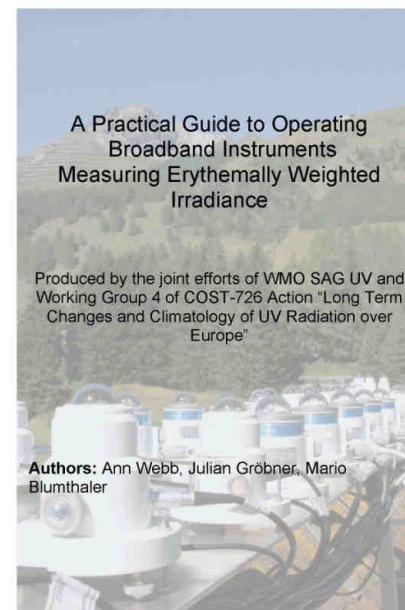
Results:

- The general ideas for Electronical Climatological Atlas (e-atlas) were defined and the decisions about its content were made.
- The content of the COST Action 726 Booklet that would provide the information about the UV climatology for public was decided.

O5: to work out the QC/QA procedures for the UV measurements with broadband instruments and create an European reference group of broadband radiometers.

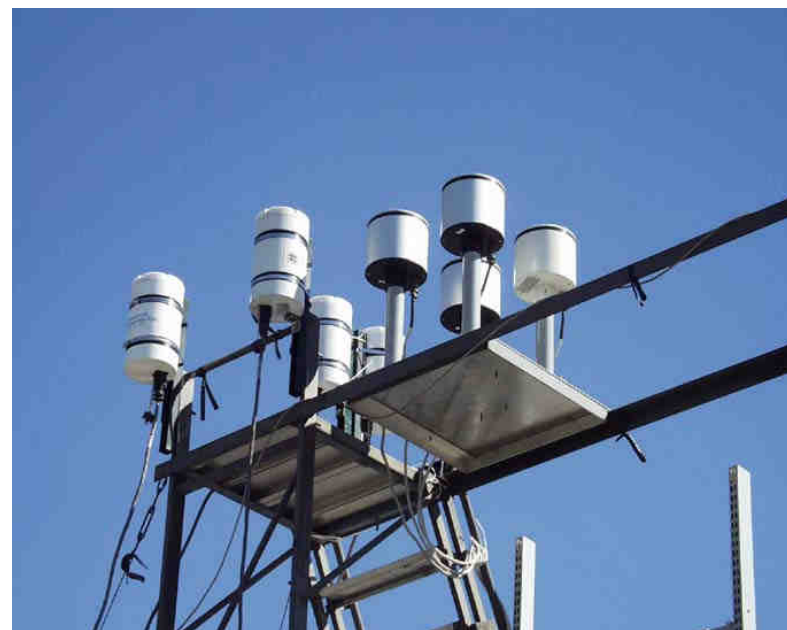
Results:

The Standard Operating Procedures for broadband instrument were prepared by COST-726 in the cooperation with the contributors to UV SAG of WMO and published.



05 Results cont.:

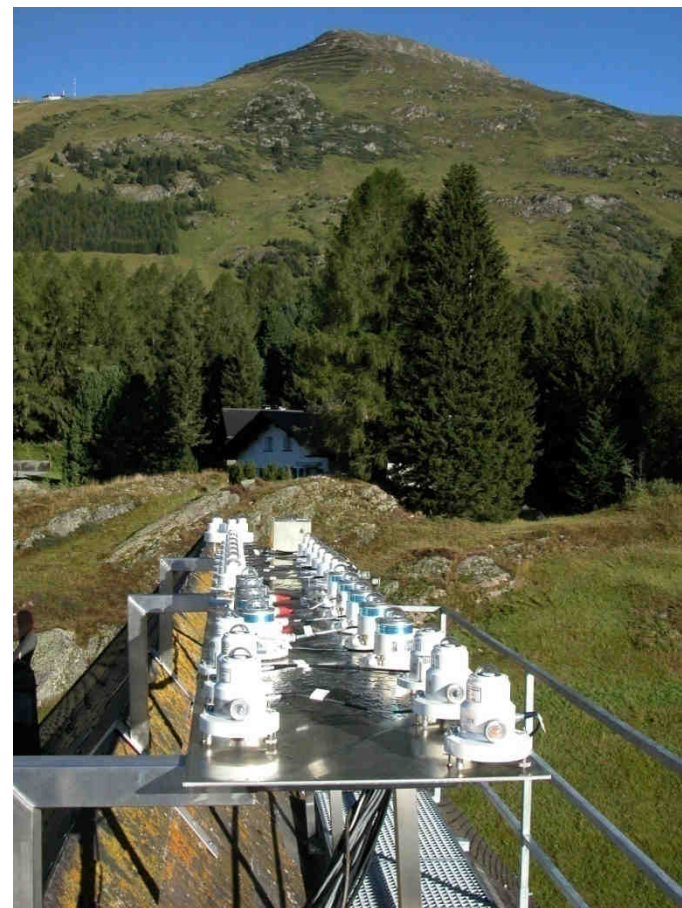
COST-726 was invited and participated in the 'Intercomparison of multiband filter radiometers (MBFR)' held in Oslo, Norway, on 13 May- 3 June 2005 and organised by the Norwegian Radiation Protection Authority.



From B.Johnsen presentation: 'Intercomparison of multiband filter radiometers (MBFR) Oslo 16 May – 3 June 2005', www.cost726.org

05 Results cont:

The calibration/comparison campaign of the broadband UV radiometers was held at PMOD/WRC Davos from 1 to 26 August 2006.



From B.Johnsen presentation: 'Intercomparison of multiband filter radiometers (MBFR) Oslo 16 May – 3 June 2005', www.cost726.org

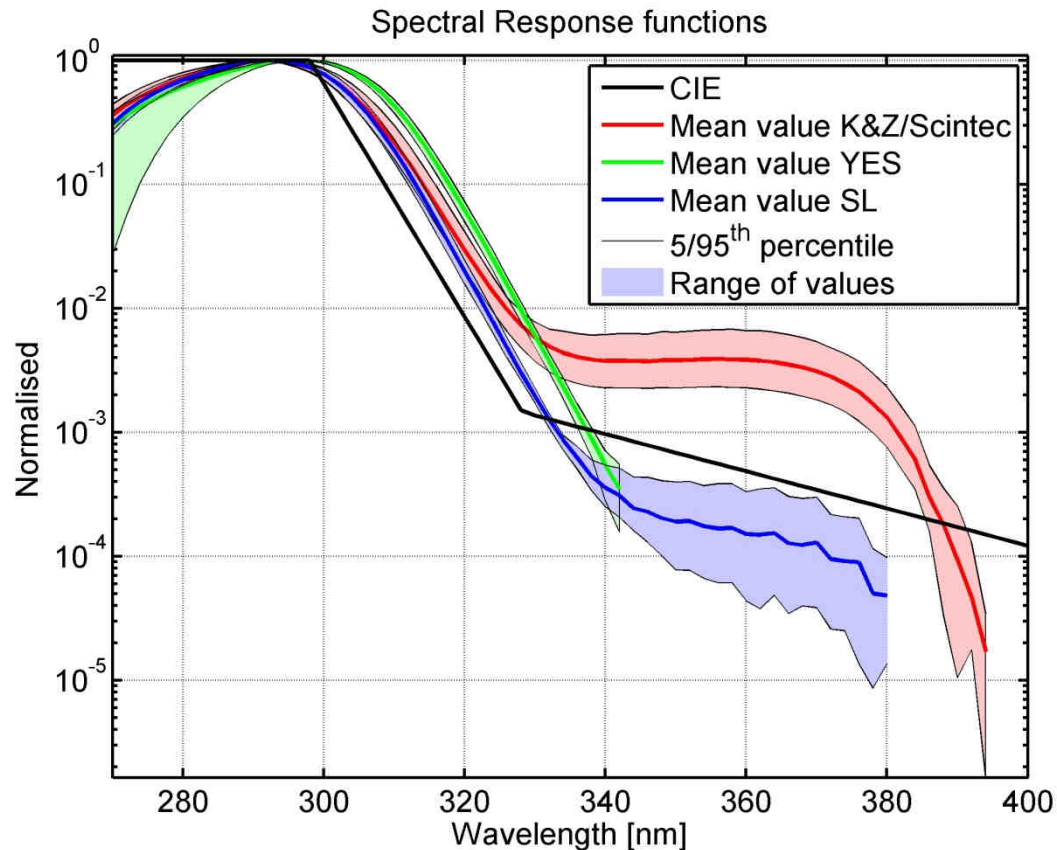


Results vs. Objectives

05 Results cont:

- The results from PMOD/WRC calibration/comparison campaign were analysed. Both, field radiometers comparison and the laboratory characterisation comparison were made.
- Campaign data and documentation were made available to the Action members.

Campaign Results



Within one group:

- ➔ Variability of the 50% intensity value $> \pm 1$ nm
- ➔ Variability of the SRF value $> 30\%$ for the long wavelength tail

From G.Hülse's presentation: 'Characterisation of Broadband Radiometers', www.cost726.org



Outcomes, Achievements, Impact and European Added-Value

- The comparative analysis of UV reconstruction models used by the European community and identification of the models suitable for building an European UV climatology.
- The comparison and quality assessment of different UV broadband instruments used for UV monitoring in European countries.
- Publication and dissemination of 'A Practical Guide to Operating Broadband Instruments Measuring Erythemally Weighted Irradiance'.



Coordination & Management

- The Action is managed in the Annual Grant System since the 1st June 2005.
- Grant Holder – Institute of Meteorology and Water Management, Warsaw, Poland. The Grant Holder Secretariat was established under the Chairwoman's management.
- Grant Holder science and administrative officers are responsible for Action's meetings minutes, reports and budget issues in cooperation with Action's Chairwoman and WGs' leaders.
- The Action's database is used for data and results collection and exchange.
- The Action's web site is used for documents dissemination and results exchange.



Encouragement of Young Scientists

- They are members of WG2, WG3 and WG4 and are involved in research works.
- Three STSMs have been completed by young scientists so far.



Results Dissemination

Conferences and Workshops

- 17th International Congress of Biometeorology 2005, 5-9 September 2005, Garmisch-Partenkirchen, Germany; joint UV session.
- COST-726 Internal Workshop, joined with ICB Symposium, 6-7 September 2005, Garmisch-Partenkirchen;
- SPIE 2006 Conference, Stockholm, Sweden, 11-14 September 2006, joint session 'Remote Sensing of Clouds and the Atmosphere XI'.

Web site

The Action's web site is run by University of Veterinary Medicine, Vienna, Austria. <http://www.cost726.org>

Publications:

- **P. Köpke, et. al, “UV exposure in Europe during the past”, in Proceedings of the 17th International Congress of Biometeorology, ICB 2005 Annale der Meteorologie, 41, 2, 659-662;**
- **Eerme K., “Variation of total solar radiation and estimated erythemal UV doses in Estonia during 1953-2004”, in Proceedings of the 17th International Congress of Biometeorology, ICB 2005 Annale der Meteorologie, 41, 2, 663-666;**
- **P.Köpke, et. al, “Modeling solar UV radiation in the past: comparison of algorithms and input data”, in Proceedings of SPIE, Remote Sensing of Clouds and the Atmosphere XI, Vol. 6362, 636215-1 – 636215-1, 2006.**
- **A.Webb, J.Gröbner, M.Blumthaler, ‘Practical Guide to Operating Broadband Instruments Measuring Erythemally Weighted Irradiance’, EUR 22595, ISBN 92-898-0032-1, COST Office, 2006, Belgium.**



Future Plans for the Action

Management:

July 2007 – June 2008:

- MCM9 and 2nd Workshop joined to the UV Conference in Davos.
- WG3 meeting joined to the ESP Congress in Bath.
- 5 STSMs (3 during comparison campaign in Spain).
- MCM10.

July 2008 - 2009 (March):

- MCM11 and MCM12.
- WGs meetings.
- 4 STSMs.
- Final workshop/conference.



Future Plans for the Action

Research:

- **Mapping exercise results' discussion at MCM9 – 2007.**
- **Next comparison campaign for broadband radiometers in Spain – 2007.**
- **Calculation of the European UV climatology and analysis of UV changes/trends, after recognising the problems (mapping exercise) and defining suitable solutions – 2008/2009.**
- **Elaboration, issuing and dissemination of the E- Atlas – 2008/2009.**
- **Elaboration, publication and dissemination of the Action's Booklet for public – 2008/2009.**
- **Summer school for young scientists – 2008.**



Future Plans for the Action

Publications:

- **Reports**

- ‘Modelling solar UV radiation in the past: Comparison of algorithms and input data’, P.Köpke, et al. – 2007.
- on the results of the comparison/calibration campaign for broadband instruments held in Davos – 2007/2008.
- on the results of the filter instruments comparison held in Oslo – 2007/2008.
- on the results of the comparison/calibration campaign for broadband instruments, Spain – 2008.
- on the results of the UV European climatology and trend analysis – 2008/2009.

- **The Action’s Booklet – 2008/2009.**

- **Materials from the Summer School – 2008/2009.**



Recognised Problems

- Availability of the input data for UV reconstruction models:
 - The main source of the data is the WMO WRDC, however, the density of the stations is uneven and reveals big gaps.
 - The gaps could be filled in with the data from the existing European stations that have not been sent to the WRDC.
 - Those stations are mostly run by national meteorological services.
 - Some national MC members have problems with obtaining the data from the meteorological services, free of charge, for the Action's research activities.

The DC ESSEM assistance in solving the above problem would be highly appreciated.



**Thank You
for Your attention!**



Additional information

The links to www web-sites of COST 726 participants:

Networks:

Austria: www.uv-index.at

Great Britain: http://www.hpa.org.uk/radiation/understand/radiation_topics/ultraviolet/index.htm

Greece: <http://lap.physics.auth.gr/uvnet.gr/>

Italy: <http://www.uv-index.vda.it/>

Norway: <http://uvnett.nrpa.no/uv/>

Switzerland: http://www.meteosuisse.ch/web/en/weather/health/uv-index/uv_measurement.html

Czech Republic: http://www.chmi.cz/meteo/ozon/UV_online.html

Poland: <http://www.imgw.pl/wl/internet/zz/pogoda/uv.html>

Single stations:

Belgium, Uccle: <http://ozone.meteo.be/uv/uv-index.php>

Italy, Firenze: <http://www.lamma.rete.toscana.it/previ/eng/ruva.html>

Luxembourg, Diekirch: http://www.restena.lu/meteo_lcd

Norway, Oslo: <http://www.fys.uio.no/plasma/ozone/main.htm>

The links are available at COST 726 web-site: <http://www.cost726.org/>