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Executive Body for the Convention on Long-range Transboundary Air Pollution

Steering Body to the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe

Working Group on Effects

Third joint session
Geneva, 11-15 September 2017
Item 3 of the provisional agenda
Progress in activities in 2017 and further development of effects-oriented activities

Effects of air pollution on materials

Progress report by the Programme Coordinating Centre of the International Cooperative Programme on Effects of Air Pollution on Materials, including Historic and Cultural Monuments

Summary

The present report by the Programme Coordinating Centre for the International Cooperative Programme on Effects of Air Pollution on Materials, including Historic and Cultural Monuments (ICP Materials) under the Working Group on Effects presents the results of the activities undertaken by ICP Materials between May 2016 and May 2017. The activities and the report on them are presented in accordance with the request of the Executive Body to the Convention on Long-range Transboundary Air Pollution in its 2016-2017 workplan for the implementation of the Convention (ECE/EB.AIR/133/Add.1, item 1.1.1.5) and the informal document approved by the Executive Body for the Convention at its thirty-fourth session, "Basic and multi-year activities in the 2016-2017 period" (items 1.1.1-1.1.3, 1.1.6, 1.1.7 and 1.8.1-1.8.3).

The report of ICP Materials presents the results of its thirty-third Task Force meeting (Hämeenlinna, Finland, 10-12 May 2017). It describes materials exposed in the 2014-2015 exposures for trend analysis, and in particular new scientific results for aluminium, and summarizes the status of the recently launched call for data on inventory

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and condition of stock of materials at risk at the United Nations Educational, Scientific and Cultural Organization cultural World Heritage Sites.

I. Introduction and overview of deliverables

1. The present report by the Programme Coordinating Centre for the International Cooperative Programme on Effects of Air Pollution on Materials, including Historic and Cultural Monuments (ICP Materials) describes the activities carried out between May 2016 and May 2017 by ICP Materials. It highlights the results of activities undertaken since its previous report (ECE/EB.AIR/GE.1/2016/13-ECE/EB.AIR/WG.1/2016/6), submitted to the second joint session of the Steering Body to the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP) and the Working Group on Effects (Geneva, 13-16 September 2016). The results are presented here in accordance with the 2016-2017 workplan for the implementation of the Convention on Long-range Transboundary Air Pollution (ECE/EB.AIR/133/Add.1, item 1.1.1.5) and with the informal document approved by the Executive Body for the Convention at its thirty-fourth session, "Basic and multi-year activities in the 2016-2017 period" (items 1.1.1-1.1.3, 1.1.6, 1.1.7 and 1.8.1-1.8.3).

2. ICP Materials is co-chaired by Mr. Johan Tidblad (Sweden) and Mr. Pasquale Spezzano (Italy), with Mr. Tidblad also acting as the head of the ICP Materials Programme Centre. Participating in the work of ICP Materials are some 30 experts from the following 18 countries: Austria, Croatia, Czechia, Estonia, Finland, France, Germany, Greece, Italy, Norway, Poland, Russian Federation, Slovakia, Spain, Sweden, Switzerland, United Kingdom of Great Britain and Northern Ireland and United States of America.

3. The thirty-third meeting of the ICP Materials Task Force (Hämeenlinna, Finland, 10-12 May 2017) was attended by18 participants from 12 countries.

4. During 2016 the following reports were delivered: "Results on corrosion and soiling from the 2011-2015 exposure programme for trend analysis"[1]; and "Technical manual for the trend exposure programme 2011-2015".[2] The most recent description of test sites, including all sites, past and present, included in the ICP Materials network, is available as an annex to the above-mentioned technical manual. The reports are available on the ICP Materials website.[3]

5. In 2017, the following ICP Materials reports are expected: "Call for data on inventory and condition of stock materials at the United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage sites — status report"; "Environmental data report 2014-2015"; and "Report on trends in corrosion and soiling 1987-2015".

II. Workplan items common to all International Cooperative Programmes

A. Guidelines for reporting on the monitoring and modelling of air pollution effects

6. The guidelines for reporting on the monitoring and modelling of air pollution effects (ECE/EB.AIR/2008/11-ECE/EB.AIR/WG.1/2008/16/Rev.1)[4] specify that for effects of

[1] ICP Materials Report No. 78 (Stockholm, Sweden, Swerea KIMAB AB, 2016).
[2] ICP Materials Report No. 79 (Stockholm, Sweden, Swerea KIMAB AB, 2016).
[3] Available from http://www.corr-institute.se/icp-materials/web/page.aspx?refid=18.
[4] Adopted by the Executive Body for the Convention at its twenty-sixth session in December 2008 (ECE/EB.AIR/96/Add.1, decision 2008/1).

particulate matter on materials the degree of soiling should be reported, and for multiple pollutant effects on materials the corrosion of indicator materials carbon steel, zinc and limestone should be reported. This is part of the ongoing activities of ICP Materials (for exposure of materials for trend analysis, see below).

B. Efforts to enhance the involvement of countries in Eastern Europe, the Caucasus and Central Asia

7. The Russian Federation is a member of the ICP Materials Task Force, but the focal point in Saint Petersburg is at present not very active. Therefore, efforts are currently being made to engage another organization for organizing a test site in Moscow.

C. Cooperation with programmes and activities outside the region

8. ICP Materials and its experts collaborate with international standardization work in the field of atmospheric corrosion, in particular in the context of International Organization for Standardization (ISO) Technical Committee 156, Corrosion of metals and alloys, and European Committee for Standardization (CEN) Technical Committee 346, Conservation of cultural heritage. A current workplan item related to the work of ICP Materials is the preparation of a new ISO technical report on procedures for mapping corrosion.

III. Workplan items specific to the International Cooperative Programme on Effects of Air Pollution on Materials, including Historic and Cultural Monuments

A. Corrosion and soiling of selected materials under different environmental conditions

9. Exposures for trend analysis are performed every third year in the network of ICP Materials test sites. The completed exposure (2014-2015) included samples of carbon steel, zinc, copper, limestone and soiling of modern glass. In addition, samples exposed for four years (2011-2015) of carbon steel, weathering steel, zinc, aluminium and limestone were evaluated and reported in 2016 (corrosion data). Stainless steel was also exposed for the first time at selected sites in the network of test sites. The subsequent report (2017) on trends in corrosion, soiling and environmental data will include trends in one-year corrosion and also unique results for trends based on repeated four year exposures during the period 1987-2015. A special study on aluminium exposed for four years and a comparison between corrosion of aluminium 1987-1991 and 2011-2015 shows that the decrease in mass loss of aluminium is about 80 per cent. The mass loss is today no longer correlated to sulphur dioxide pollution levels; instead, the maximum pit depth and particulate matter deposition is correlated.

B. United Nations Educational, Scientific and Cultural Organization cultural World Heritage Sites

10. A call for data on inventory and condition of stock of materials at UNESCO cultural World Heritage Sites was launched in 2015. The Programme Task Force agreed to launch the call for data at its thirty-first meeting (Kjeller, Norway, 22-24 April 2015). A pre-announcement letter was sent to heads of delegation to the Working Group on Effects

in June 2015 for early information purposes. A proposal for the call was approved at the first joint session of the Steering Body to EMEP and the Working Group on Effects (Geneva, 14-18 September 2015). The call for data was launched on 22 October 2015.

11. The main purpose of the call for data is to offer interested Parties the opportunity to collect available documented information to be used for the identification of UNESCO cultural World Heritage Sites that are at a potential risk of corrosion or soiling and to provide relevant data on the adverse effects of air pollution on the region's built heritage. The ultimate objective is to provide policymakers with evidence of the effects of air pollution, not on a generic material or a generic artefact, but on easily recognizable symbols of culture and history.

12. The status of the call was presented and discussed at the thirty-second meeting of the Programme Task Force (Rome, 11-13 May 2016). The Task Force discussed ways to encourage participation in the call and stressed that the call should promote national activities on the effects of air pollution on cultural heritage, within the limits of available resources. Preliminary indications on the modalities of participation were presented by some of the members of the Task Force. During the meeting, it was also agreed to postpone the deadline from 30 March to 30 June 2017 in order to facilitate the collection of data and participation in the call.

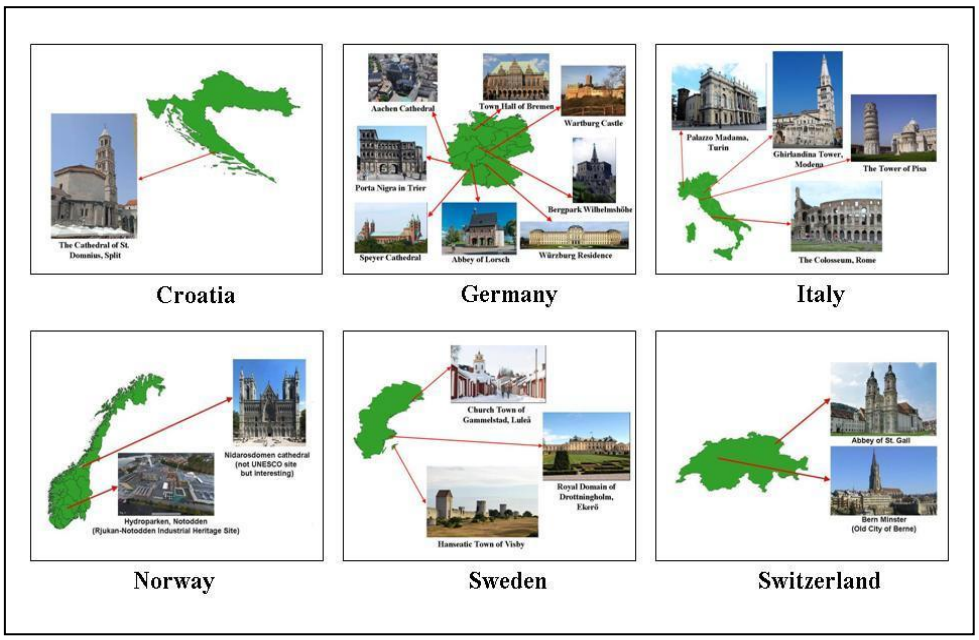
13. A page dedicated to the call for data was added to the ICP Materials website, where all documents provided by the call are available for downloading: the official letter of the call for data; a template for submission of data; an explanatory note with instructions on the use of the reporting template; and a brochure exemplifying the step-by-step approach for the previously assessed UNESCO sites. Some examples of the filled in reporting template are also available for download from the web page.

14. The advancement of the call for data was further discussed at the thirty-third meeting of the Programme Task Force, in the framework of the discussion on the implementation of the 2016-2017 workplan. Parties to the Convention participating in the call had the opportunity to report on the state of progress and to present the collected data relating to the UNESCO sites in their countries and considered in the study.

15. So far, property and environmental data have been provided for twenty unique cultural monuments (in Croatia, Germany, Italy, Norway, Sweden and Switzerland). A status report is expected in 2017 (see also figure below).

16. The Task Force also discussed the future development of call-related activities. It was agreed that two reports should naturally follow the status report expected in 2017 and should constitute the main milestones of the 2018-2019 workplan: a report on risk assessment in 2018 and a report on economic evaluation in 2019.

Figure
Cultural heritage objects selected for the study



IV. Messages for the attention of other bodies

17. The 2014-2015 exposure for trend analysis has been successfully completed and a detailed analysis of trend results for the period 1987-2015 are ongoing, with some preliminary results for aluminium presented above. A complete report will be available by the time of the third joint session of the EMEP Steering Body and the Working Group on Effects.

18. The information regarding the involvement of the Russian Federation is relevant for the further involvement of countries in Eastern Europe, the Caucasus and Central Asia.

19. Six parties to the Convention are participating in the call for data on inventory and condition of stock of materials at UNESCO cultural World Heritage Sites: Croatia, Germany, Italy, Norway, Sweden and Switzerland. Of these, Croatia has previously not participated in the activities of ICP Materials and its contribution is therefore especially welcomed.