**WORLD METEOROLOGICAL ORGANIZATION**

**COMMISSION FOR INSTRUMENT AND METHODS OF OBSERVATION**
***OPAG-SURFACE***

**EXPERT TEAM ON SURFACE TECHNOLOGY AND MEASUREMENT TECHNIQUES**
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# PROGRESS OF URBAN AND ROAD METEOROLOGICAL MEASUREMENTS

## 1. Urban meteorological measurements

## 2. Road meteorological measurements

*Submitted by Chairman*

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**Summary and Purpose of Document**

The document contains an introduction on the requirements for standards and practices of observing systems for (1) road meteorology and for (2) urban meteorology

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**ACTION PROPOSED**

The meeting is invited to take notice of the document and to supply suggestions or recommendations on how to develop technical recommendations for standards and practices and to provide documentation.

**References:**

1. CIMO-XIII, abridged final report
2. CIMO MG (2003) final report
3. IOM 61 (TD 842), *Road Meteorological Observations* (1997)
4. IOM 77 (TD 1159), *Road Managers and Meteorologists over Road Meteorological Observations - The Result of Questionnaires* (2003)
5. *Observing Urban Weather and Climate,* in: IOM 70 (TD 877), pp. 1 (TECO-98 key-note paper)
6. *The requirements of Urban Meteorological Measurements and CIMO's Role,* in: IOM 74 (TD 1028), pp. 344 (TECO-2000 key-note paper)
7. CIMO Guide (WMO-No. 8, 7th edition -*to be issued*, new chapters on Road Meteorology and on Urban Meteorology)

## Background

### 1.1. Introduction

For a long time meteorological observations are carried out for the traditional disciplines in meteorology and hydrology, like synoptical meteorology, climatology, agricultural meteorology, *etc.* The constraints and requirements for these observations are always formulated taking the specific applications into account. Although these applications may differ significantly for those disciplines, observations of the traditional physical variables like pressure, temperature, wind, *etc.* can be performed by uniform and recommended methods and instruments. Some applications however, like for aeronautical meteorology, require very specific and sometimes rather alternative methods of observations.

During the last two decades two specific disciplines in meteorology are recognized:

(1) Road Meteorology

(2) Urban Meteorology

These two disciplines are very specific because it deals with direct impact of the weather on human activities (transportation) or on the impact of the weather on an environment, which differs from the traditional 'open air' observation sites (like in densely populated cities with its own climate). Both disciplines have very specific requirements for meteorological observations, not only with respects to instruments but in particular to the methods of observation and siting. To ensure representativety of observations, both disciplines have their own and very specific requirements, which differ from the traditional standards like for synoptical meteorology or climatology. To develop guidance material and recommendations on standard procedures to observe the weather suitable for the applications in the field of these disciplines is a very challenging task.

### 1.2. Background information

#### 1.2.1. Road meteorology

At CIMO-XI (1994) a proposal was adopted to start a new activity in the field of road meteorological instrumentation systems and methods of observation. Standardizing in this field and providing guidance to Members would ensure cost-effective use of appropriate technologies. As a consequence questionnaires two both road managers and meteorologists involved in road meteorology were send out. Results of these questionnaires are reported in:

- IOM 61 (TD 842), *Road Meteorological Observations* (1997)
- IOM 77 (TD 1159), *Road Managers and Meteorologists over Road Meteorological Observations - The Result of Questionnaires* (2003)

Both reports express the very autonomous attitudes of the road managers with regards to observing systems and siting for their specific use as information tool on present weather (in particular dangerous, severe weather).

Moreover a new chapter is written for the next edition of the CIMO Guide, which is in its final editing phase. In this chapter guidelines and recommended practices are stated which will be helpful for road managers who want to design a network of instruments useful for road meteorological applications.

#### 1.2.2. Urban Meteorology

Begin of the 1980's WMO has recognized the importance of the impact of densely populated areas on its environment. Industry, transport and other heat and gasses producing activities on the first place and huge buildings and other artificial constructions on the other hand do influence the local climate of an urban area. Because of the impact on human beings living in these areas, a better knowledge and understanding of these processes are of outmost importance. This is recognized

by Congress and C-XIII (1999) has invited CIMO to "*Study and develop guidance on siting and exposure of instruments in urban areas"*.

As a consequence a new chapter is written for the next edition of the CIMO Guide, which is in its final editing phase. In this chapter guidelines on siting and exposure and also recommended practices are stated which will be helpful for urban meteorological applications.

## Activity plan

### 2.1. Planned activities

In line with CIMO XIII, the CIMO management group has decided to continue the work on road and urban meteorological observations. In particular technical recommendations and practices on road and urban meteorological measurements should be prepared, which will be published in a next edition of the CIMO Guide.

For road meteorology the differences in perception of WMO standards for synoptic stations at road meteorological stations has to be explored, especially in the light of the requirements of modern road monitoring and traffic management systems.
For urban meteorology the emerging requirements for measurements have to be monitored in cooperation with the user community.

### 2.2. TIME TABLE

***ROAD METEOROLOGY***

| | ***DELIVERABLE*** | ***DEADLINE*** |
|---|---|---|
| A. | TECHNICAL RECOMMENDATIONS AND PRACTICES ON ROAD METEOROLOGICAL MEASUREMENTS | NOVEMBER 2005 |
| B. | UPDATE CIMO GUIDE (CHAPTER ON ROAD METEOROLOGY) | DECEMBER 2005 |

***URBAN METEOROLOGY***

| | ***DELIVERABLE*** | ***DEADLINE*** |
|---|---|---|
| A. | TECHNICAL RECOMMENDATIONS AND PRACTICES ON URBAN METEOROLOGICAL MEASUREMENTS | NOVEMBER 2005 |
| B. | UPDATE CIMO GUIDE (CHAPTER ON URBAN METEOROLOGY) | DECEMBER 2005 |