



Atmos'Fair 2010 –
Lyon, 28 & 29 septembre 2010

CEN –TC264-WG27
**Air Quality - Determination of odour
exposure in ambient air by using field
inspection**
**Status on progress of CEN-work on
the future standard**



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Two different methods are discussed:

1. Grid measurement method

2. Plume measurement methods



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Common characteristics :

- Based on odour recognition by panel members
- The basic measurement result is absence or presence of odour (yes/no) on a given measuring point and on a given moment



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Common goals :

- Identify in an objective way the impact of odour sources in the environment
- Provide a tool-set for the verification of the respect of limit values given by authorities
- Provide a tool-set for decision makers and authorities in the case of complaints
- Describe a method providing data for the evaluation of source emissions using reverse atmospheric dispersion modelling



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1. Grid measurement method

This method is derived from the
German VDI 3940 Blatt 1 standard



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1. Grid measurement method - Scope

This European Standard describes the Grid Method for the determination of the level of exposure to ambient odours in a defined area of study, using direct observation in the field by human panel members and for the maximum extent of detectable odours from a specific source.

The present standard is a set of instructions for measurement of ambient odour exposure within a defined assessment area, using qualified human panel members, over a **sufficiently long period of time** to be **representative for the meteorological conditions of that location** (or in exceptional cases a relevant set of meteorological conditions), and hence determine the distribution of the frequency of exposure to odours within the assessment area. The sources of the odour under study may be located within or outside the assessment area. The primary application of this type of measurement is to characterise the level of odour exposure within the study area, in order to assess whether the impact of that exposure on resident population could be a justified cause for annoyance, using exposure criteria.

The unit of measurement is the frequency of odour hours for an area defined by four measurement points.



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1. Grid measurement method

Principal characteristics:

- Based on statistically distributed odour observations on predefined points
- Half a year of measurements minimum
- Allows identification of the impact of multiple sources in the domain by giving odour exposure expressed as odour hour frequency in % of the year



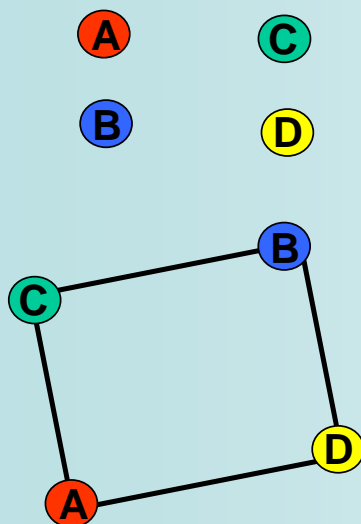
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Inspection - Grille

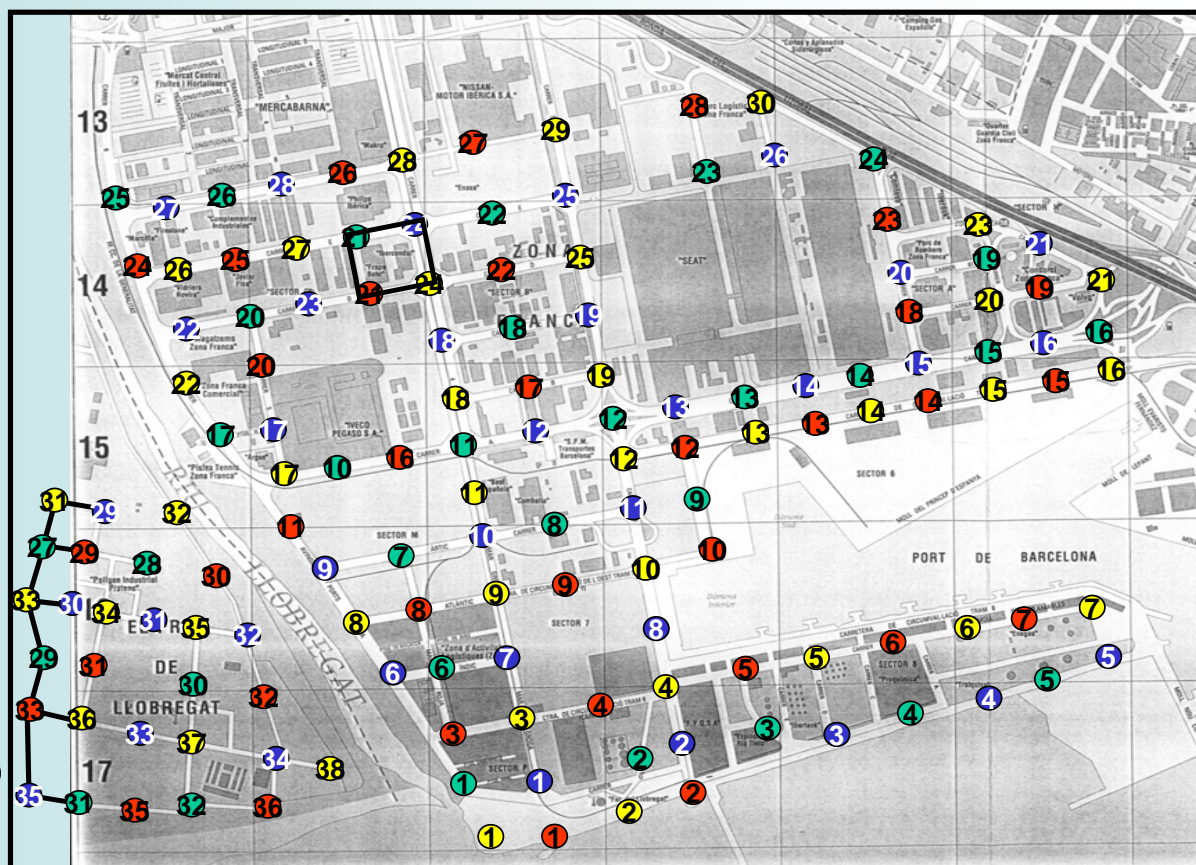
Durée ½ année
13 fois par
sous-nœud (coloré)



52 valeurs/nœud



Zone portuaire





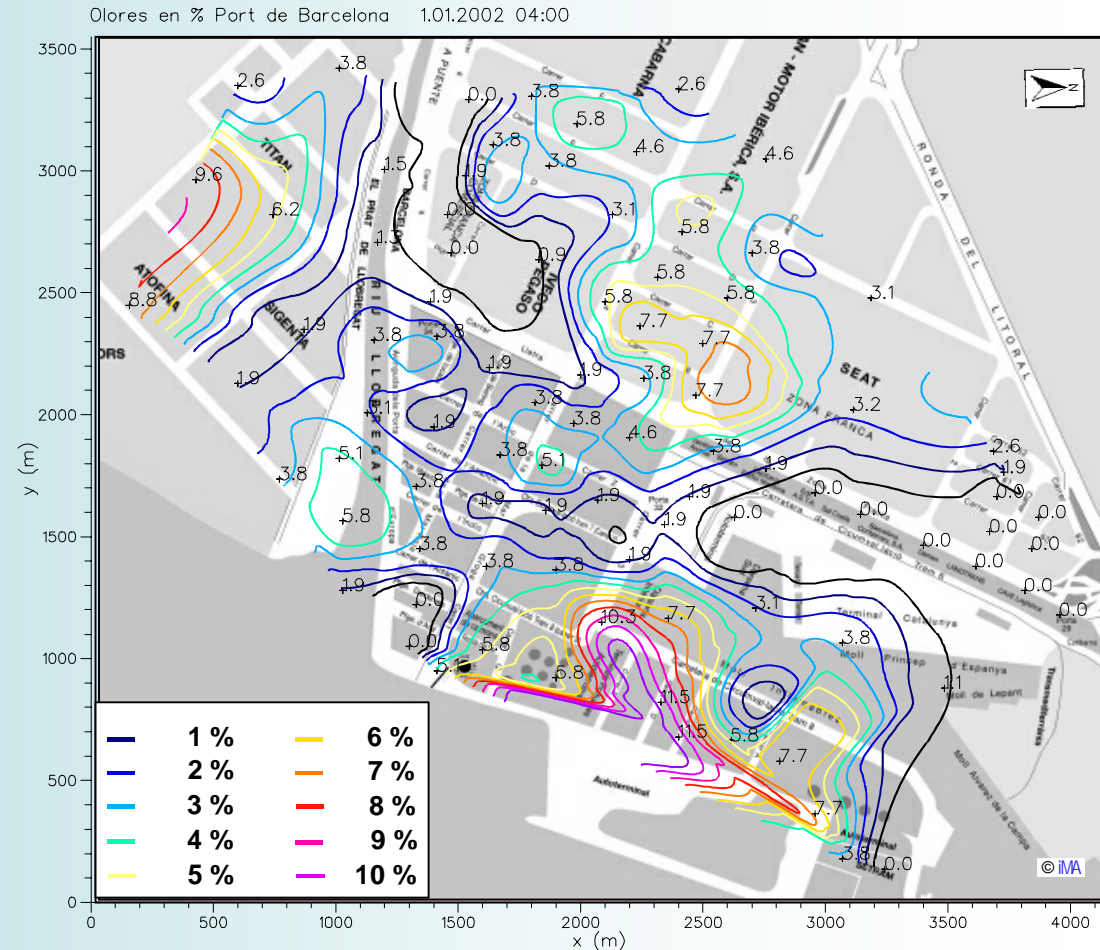
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Exemple type

Zone industrielle

Inspection de terrain
d'une zone
portuaire
avec
14 types d'odeurs

*Exemple :
Hydrocarbures
et
solvants*





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2. Plume inspection methods

One German method derived from VDI 3940 Blatt 2 standard,
called “**stationary**” method
and

One Belgian and one Dutch method,
called “**dynamic**” method



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2. Plume inspection methods – scope I

This European Standard describes the Plume Method for determining the extent of detectable and recognisable odours from a specific source using direct observation in the field by human panel members under specific meteorological conditions.

With the plume method the presence or absence (YES/NO) of recognisable odours in and around the plume originating from a specific odour emission source, **under a specified emission situation and meteorological conditions (specific wind direction, wind speed and boundary layer turbulence)** is determined.

The unit of measurement is the presence or absence of recognisable odours at a particular downwind location. The extent of the plume is assessed as the transition of absence to presence of recognisable odour.



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2. Plume inspection methods – scope II

... The results are typically used to determine a plausible extent of potential exposure to recognisable odours, or to estimate the total emission rate using reverse dispersion modelling.

The field of application of this European Standard includes:

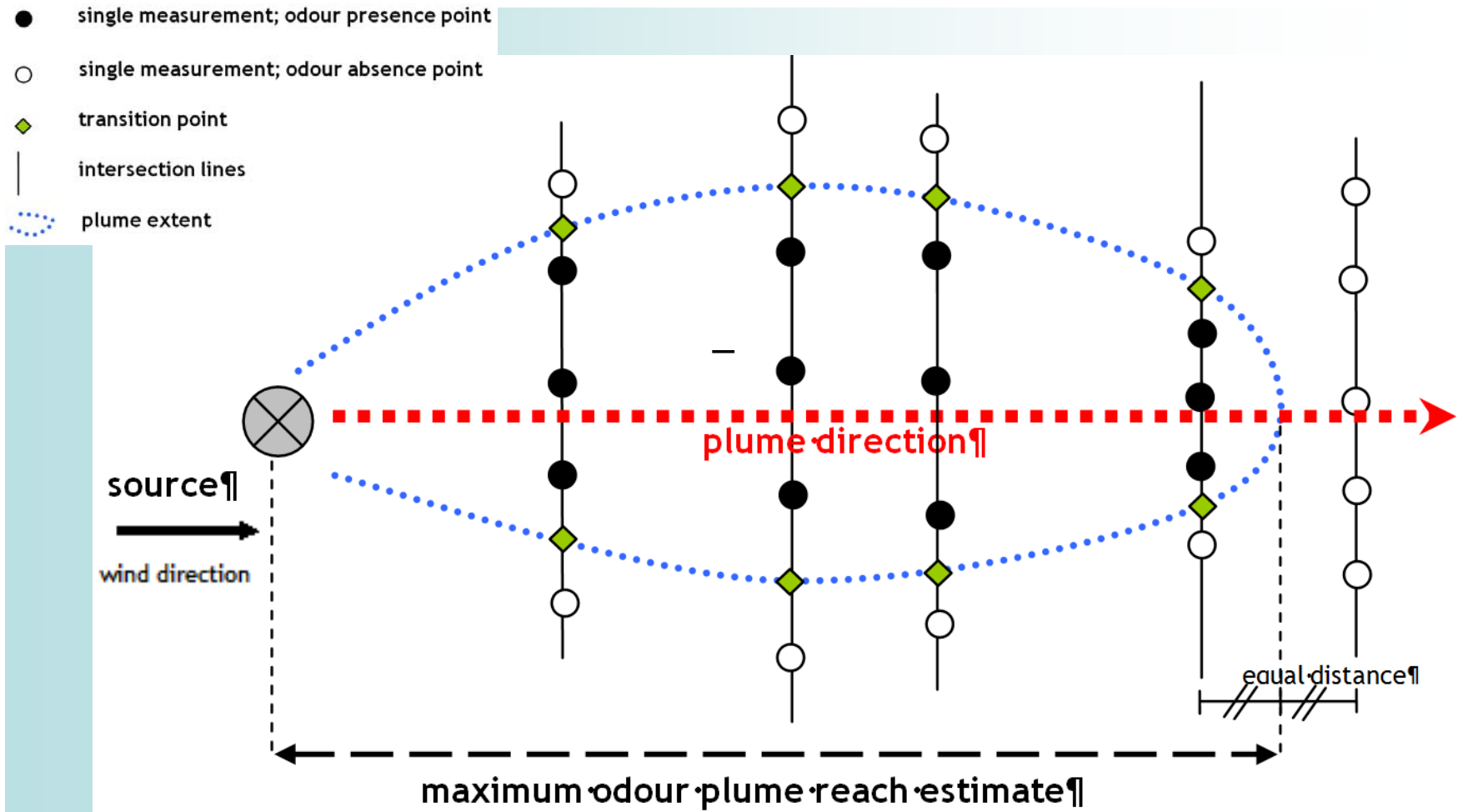
- * The determination of the extent of the recognisable odour plume downwind from a source, under specific meteorological conditions (e.g. wind direction, wind speed, turbulence)

This European Standard does not include:

- * the measurement of the frequency of occurrence of odour hours as a representative value for the average meteorology of a location
- * the measurement of intensity of ambient odours
- * the measurement of hedonic tone of ambient odours
- * the calculation of estimated source emission rate from the plume extent using reverse dispersion modelling



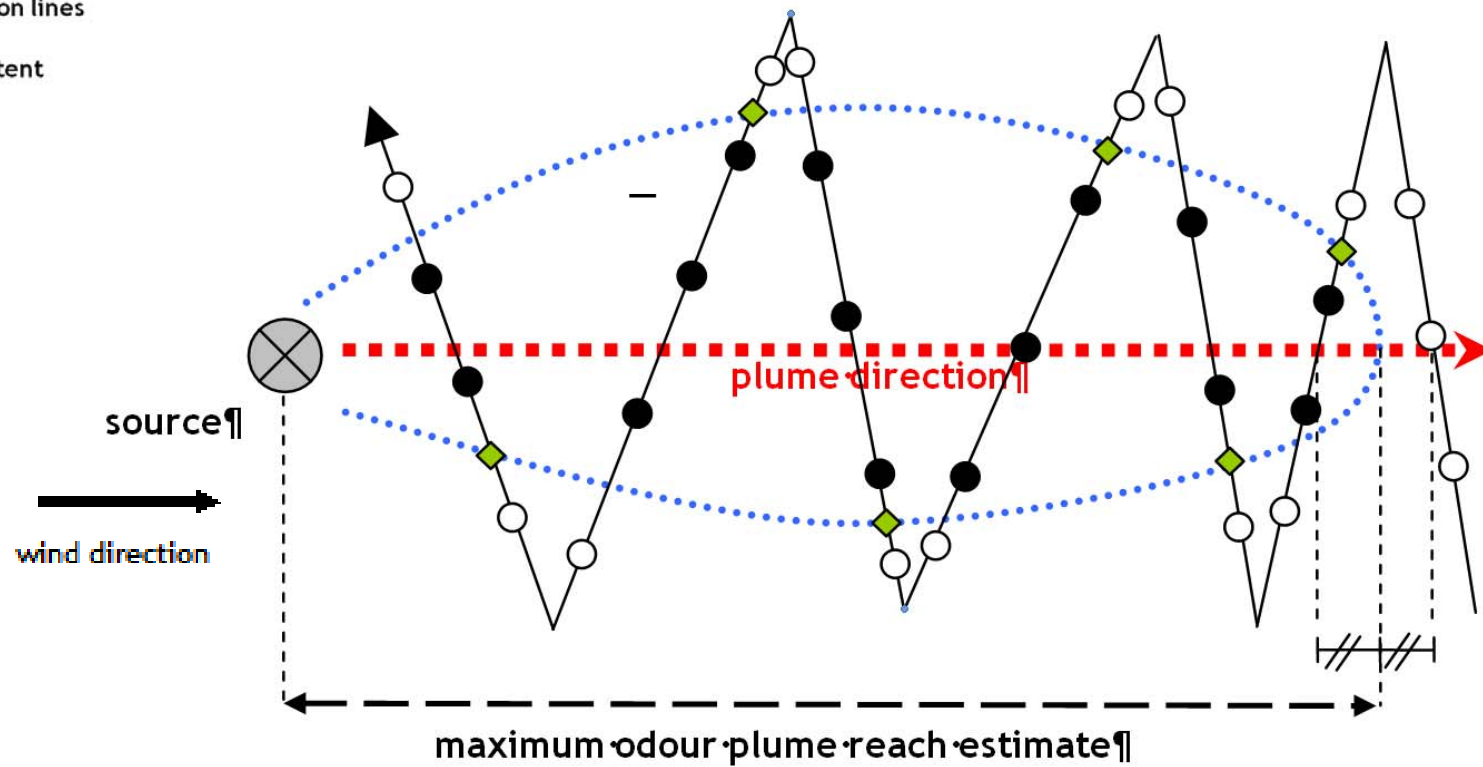
Stationary method





Dynamic method

- single measurement; odour presence point
- single measurement; odour absence point
- ◆ transition point
- intersection lines
- ⋯ plume extent





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Some results of a test of 3 methods in Nörvenich (Germany) on 14 – 16th of June, 2010

1. The Dutch and Belgian methods are alike, but the main difference is that in the Dutch method only one transition point is determined, while the Belgian method determines the complete plume extent with different transition points. Especially in the case of changing wind directions, the Dutch method risks to be imprecise because it is not sure whether the final point is found.



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2. The stationary method has the advantage that more information is gathered about the variation in time of the plume.
3. The stationary method is very strict while the Belgian and Dutch method gives more room for interpretation; there is less risk of influencing each other in the stationary method
4. The use of a meteorological station on site is very useful to check the variation in meteorological conditions afterwards and to check the validity of these conditions. Additionally it can be mentioned that these data are needed for back calculation.
5. The criteria for the meteorological situation need to be more strict for the Belgian method.



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Remaining discussion points :

a) Grid measurement :

Work on temporal and spatial representativity of meteorological wind measurements

b) Plume measurement :

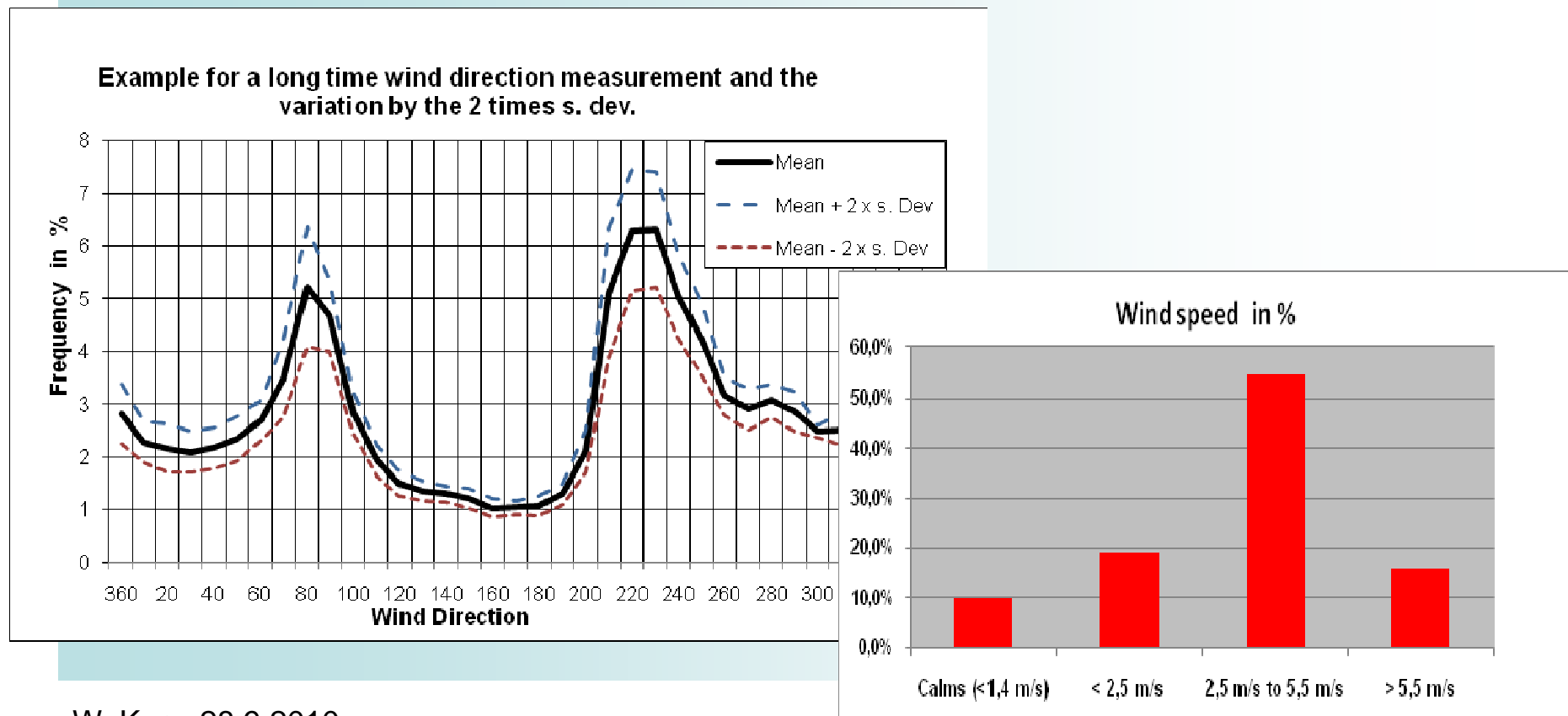
1. The criteria for the meteorological conditions for the dynamic plume method need to be more specified, variation in wind direction should be defined in standard deviation.

2. Use of **ultrasonic** meteorological station with **high temporal resolution** is necessary (adopted in August).



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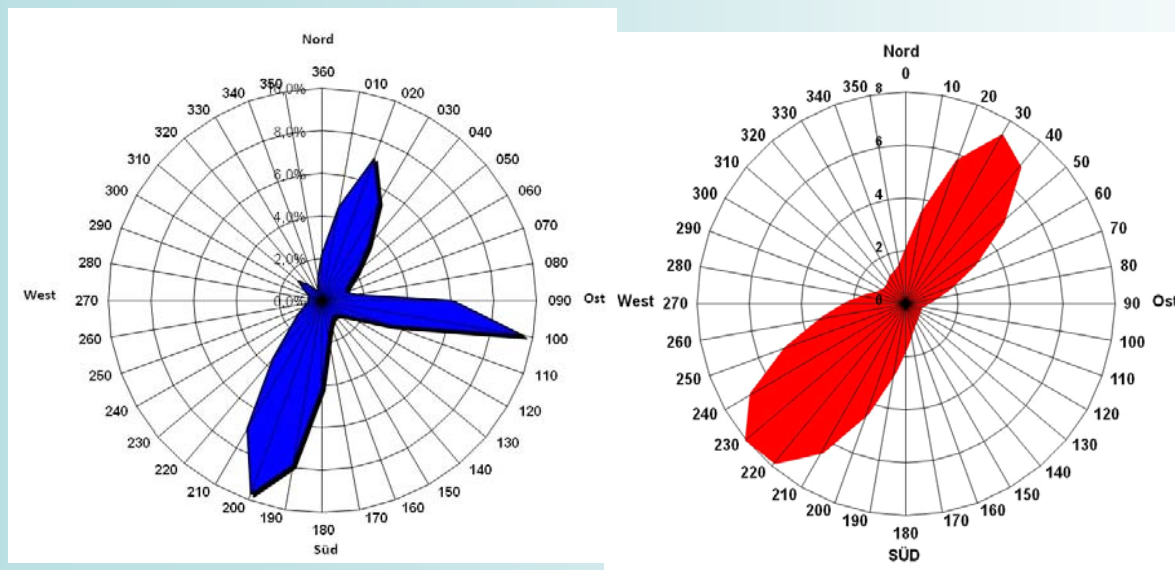
Example for importance of meteo conditions measurements:
Temporal representativity:





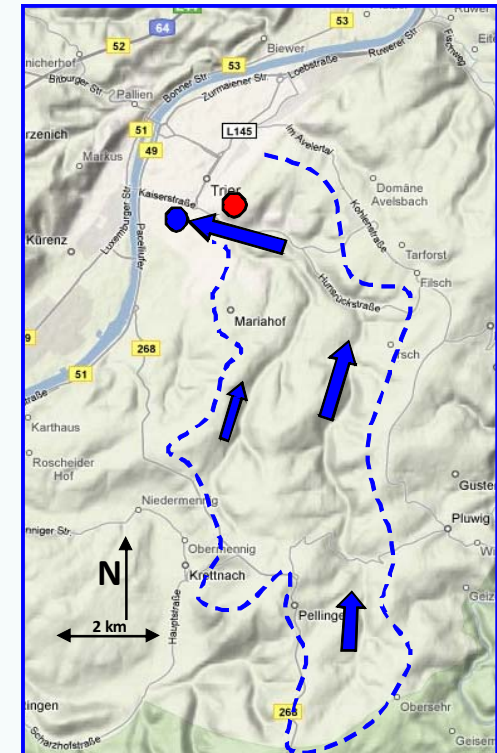
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Example for importance of meteo conditions measurements:
Spatial representativity:



Nearby station

Station 2 km away





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Thank you for your attention

Contact:
W. Kunz
KTT-iMA Sarl
20, imp. des Fauvettes
F-57460 Behren-lès-Forbach
wkunz@ktt-ima.com