IWAIS2015
16TH INTERNATIONAL WORKSHOP ON ATMOSPHERIC ICING OF STRUCTURES

Wet-snow activity research in Italy

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30 June 2015

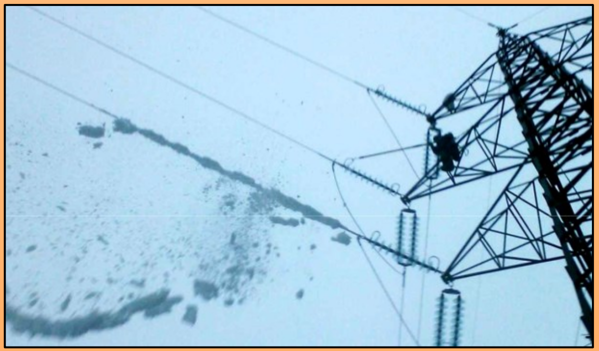
Wet-snow research activity in Italy

IWAIS2015; Uppsala (Sweden)

Direct effects

Indirect effects

Emergency & Restore Operations



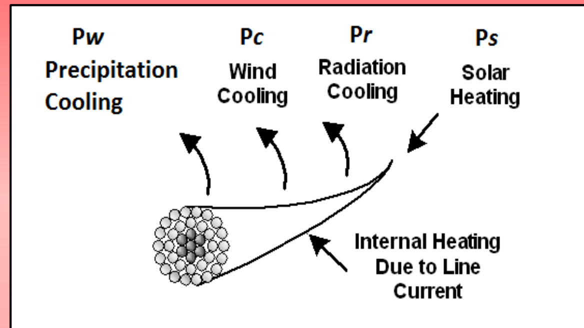
The approach to the problem in Italy

Active Methods

Anti-icing device

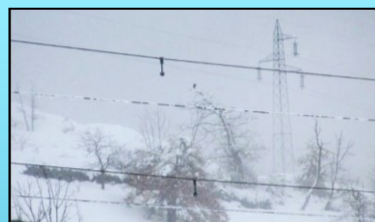
Thermal Methods

Joule-effect anti-icing



Passive Methods

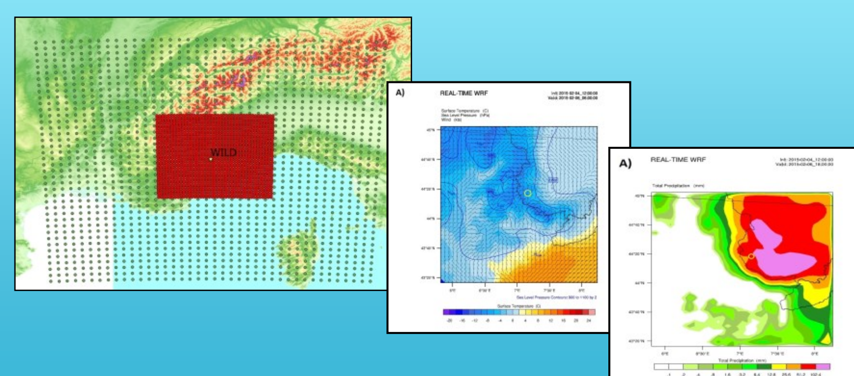
Counterweight



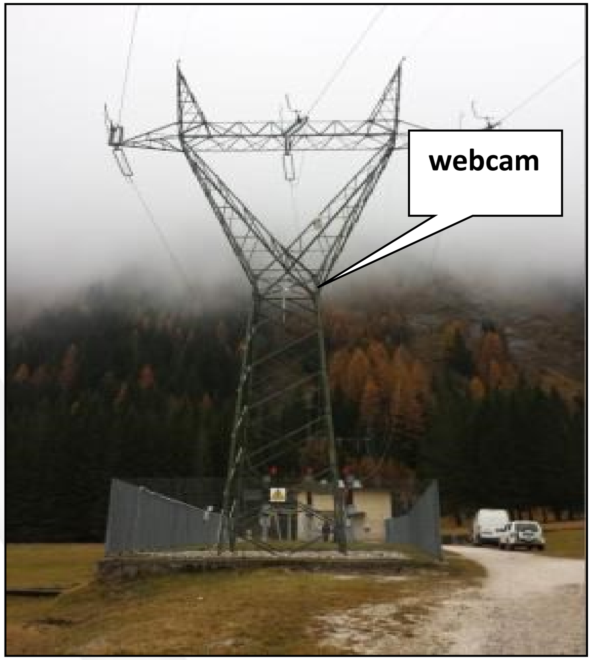
Test of innovative coatings (ice&hydrophobic)

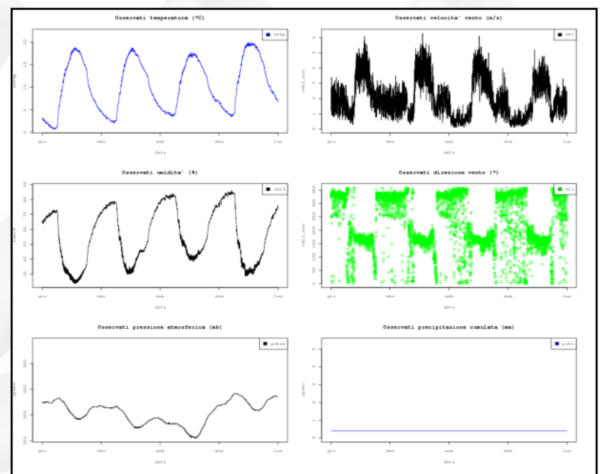
Prediction system

Numerical weather forecast and wet-snow load alert on overhead lines



Real time monitoring on operating overhead line





weather measurements

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Testing six wet snow models by 30 years of observations in Bulgaria

Dimitar Nikolov, National Institute of Meteorology and Hydrology - Bulgarian Academy of Sciences (NIMH-BAS), Bulgaria (33)

TESTING SIX WET SNOW MODELS BY 30 YEARS OF OBSERVATIONS IN BULGARIA

Dimitar Nikolov[1], Lasse Makkonen[2]

1 - National Institute of Meteorology and Hydrology – Bulgarian Academy of Sciences,

2 - VTT - Finland

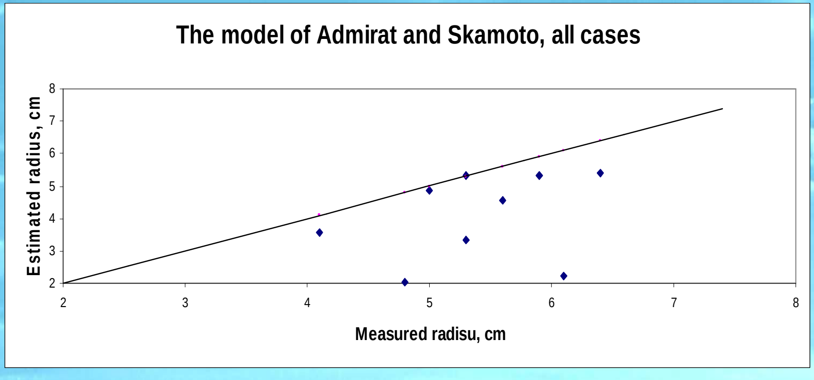
- Six simple wet snow accretion models are applied for simulations of well documented historical severe wet snow events in Bulgaria for the period 1969-1998.
- The data base consists of information about the diameters and masses, and thereof about the densities, of wet snow depositions in cases of damages on power lines.

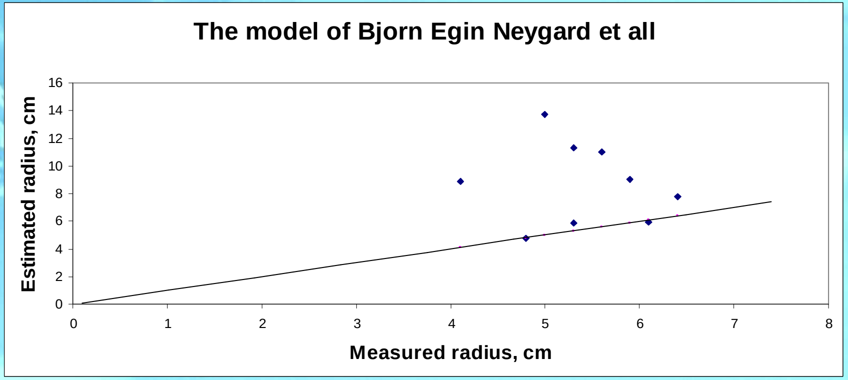
Sampling and measuring procedure from the event on 02-03.02.1986 – the most sever wet snow case ever recorded in Bulgaria, mean radius – 6.1 cm, mean wet snow load – 6.5 kg/m

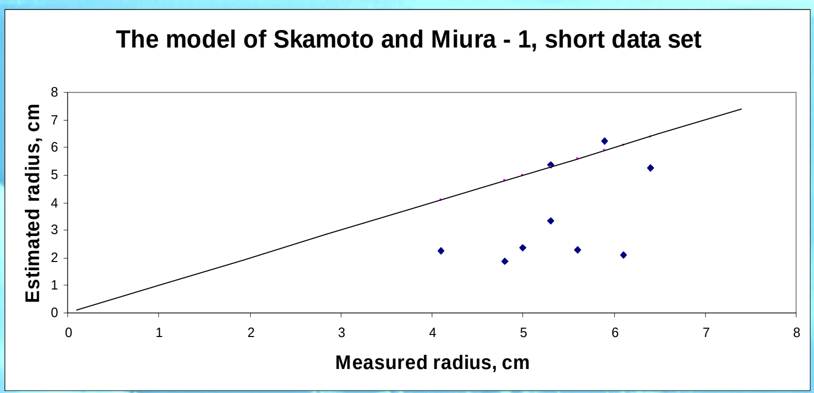
• For all cases is checked if the meteorological conditions correspond to the wet snow accretion criterion of Makkonen.

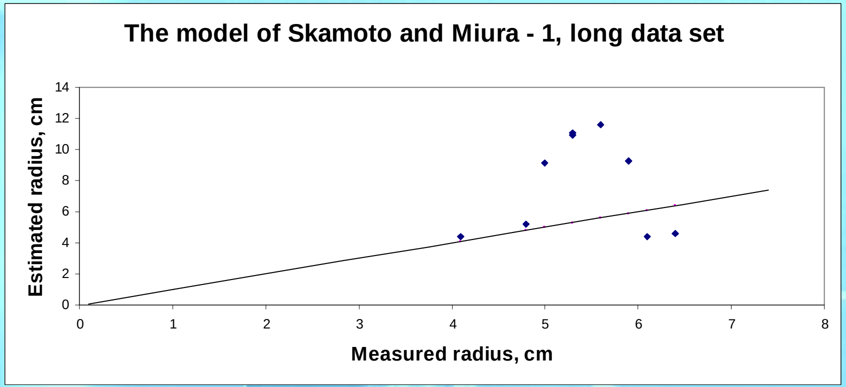
• The models used in this study are: the model of Admirat and Sakamoto (Admirat et all., 1986a and b, Admirat and Sakamoto, 1988a), the model of Finstad et al. (1988), two model suggestions of Sakamoto and Miura (1993), the model of Makkonen (1989) and its improvement (Makkonen and Wichura, 2010) and one with the latest suggestion for the sticking efficiency of Björn Egil Nygaard et al (2013).

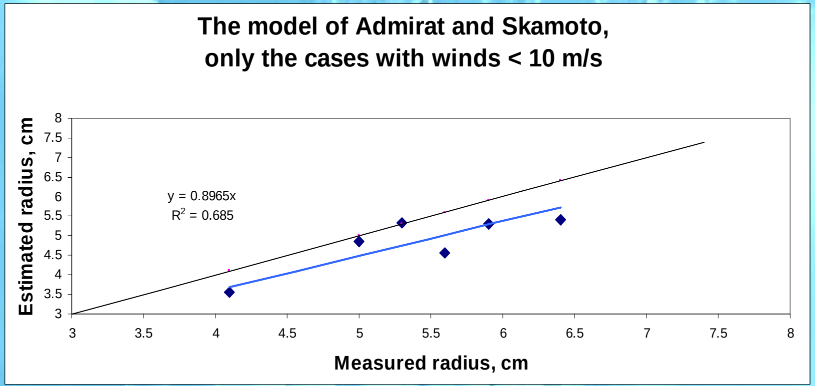
The results are graphically summarized in the following six scatter plots

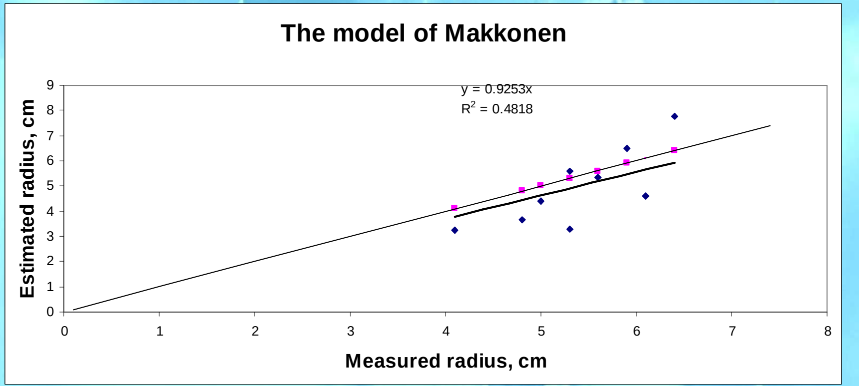












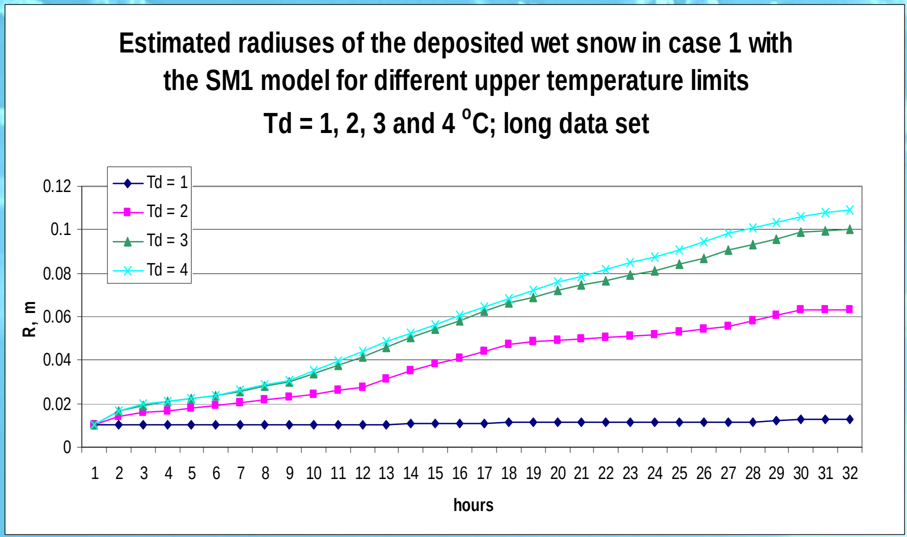
The influence of the data transformation

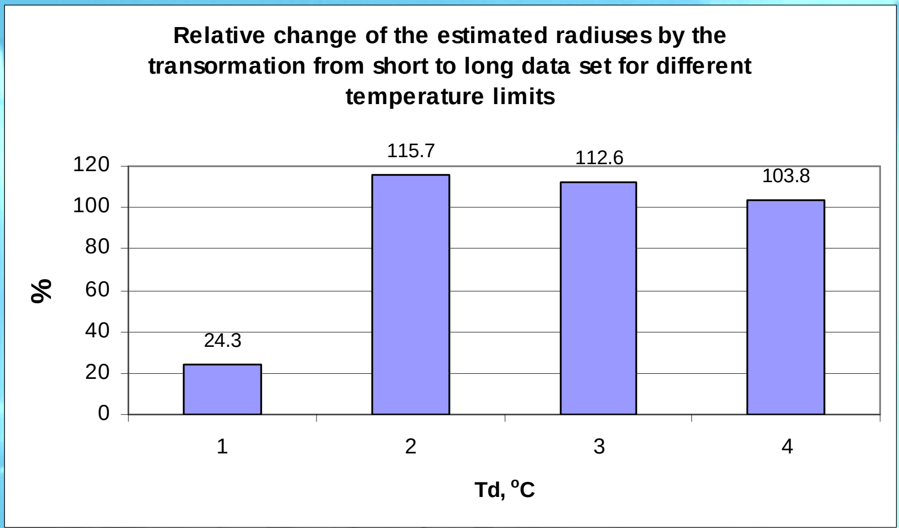
- All models, except for the S-M-1, undergo very low change with this transformation and the AS model even not any.

Table 1 Relative changes between the short and long data sets for the first four cases (values in %)

AS	Finst.	S-M-1	S-M-2	BEN	LM
0.0	- 3.9	48.1	- 3.4	- 0.9	2.3

The influence of the chosen temperature limit





It could be summarized that S-M-1 model is vastly sensitive to transformation of the input data, especially when the air temperature is close to the point of the maximum of α_2 for the selected Td.

The location of these points depends on the chosen upper temperature limit and this is another important sensitivity of the model.

The S-M-2 model is also influenced by the chosen Td but in much lower degree.

Conclusions

- The models with best performance seem to be AS and LM – they both have relative good estimations of the measured values; both ate not sensitive to the data transformation and they always have close results.
- However, they have some limitations:
  - above 10 m/s AS underestimates the depositions;
  - the LM should be used carefully when fog is presented together with the snowfall.
- The BEN model usually gives overestimation but yields very good results for wet snow conditions accompanied by high wind speed.
- The S-M-1 model sometimes gives good results but is very sensitive to the meteorological input information and to the chosen temperature limit.
- The other two models (S-M-2 and Finstad) always underestimate the depositions, probably due to the very high dependency on the wet snow radius.

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Effect of alkyl chain length on the hydro/ icephobic properties of SAMs coatings on aluminum alloy 6061 surfaces

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How the “Steric effects” Affect Ice Repellency, UV stability and Corrosion Resistance of Dissimilar SAMs Coatings on a AA2024 Alloy

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