



Modeling wet snow accretion on power lines: Improvements to previous methods using 50 years of observations

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Methods to model wet snow accretion on structures are developed and improved, based on unique records of wet snow icing events as well as large datasets of observed and simulated weather. Hundreds of observed wet snow icing events are logged in detail in an icing database, most of which include an estimate of the mean and maximum diameter of observed icing on overhead power conductors. Observations of weather are furthermore available from a dense network of weather stations. The existing models for wet snow accretion on a standard cylinder are updated with realistic values for the terminal fall speed of wet snow flakes together with a snow flake liquid fraction based criterion to identify wet snow. The widely used parameterization of the sticking efficiency is found to strongly underestimate the accretion rate. A calibrated parameterization of the sticking efficiency is suggested based on long term statistics of observed and modeled wet snow loads. Application of the improved method is demonstrated in a high resolution simulation for a case of observed widespread and intensive wet snow icing in South-Iceland. The results form a basis for mapping the climatology of wet snow icing in the complex terrain of Iceland as well as for preparing operational forecasts of wet snow icing and severe weather for overhead power transmission lines in complex terrain.