Neural network approach to characterize the atmospheric ice compressive strength

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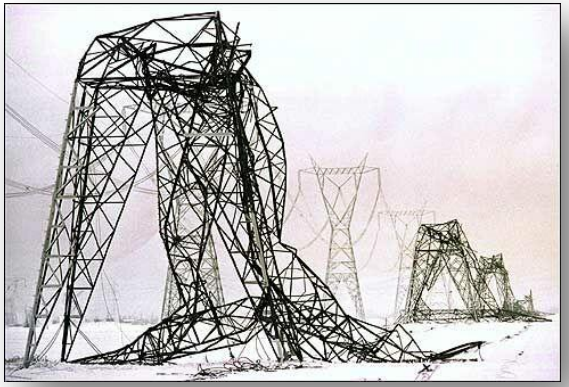
Outline

1. *Introduction*
2. *Experimental methodology*
3. *The Neural networks approach*
4. *Results*
5. *Summary*

1. Introduction

Hydro-Québec (1998)

Meteo Magazine n°10

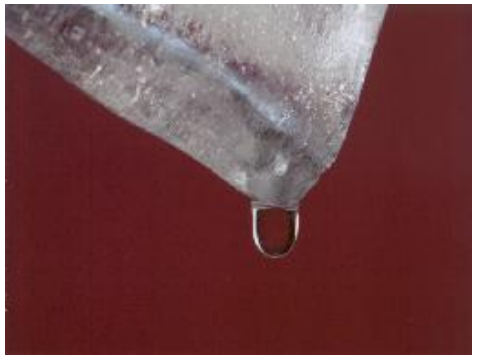


Hydro-Québec (1998)

Hydro-Québec (1998)

Effects of atmospheric icing power networks

1. Introduction

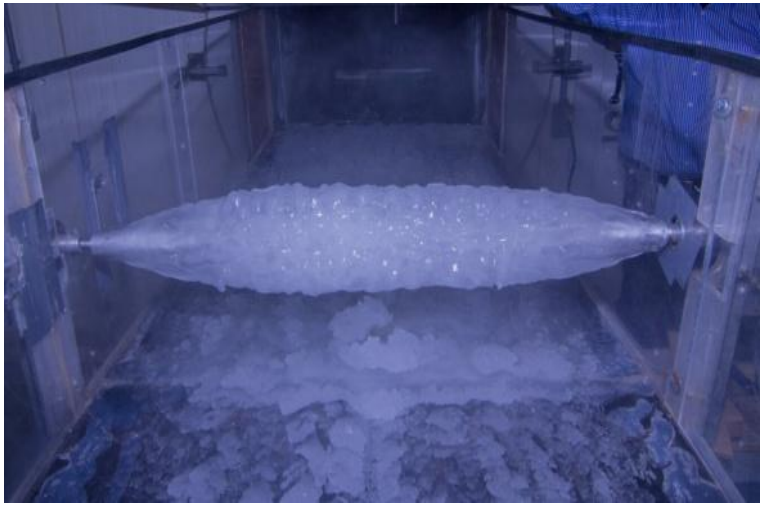


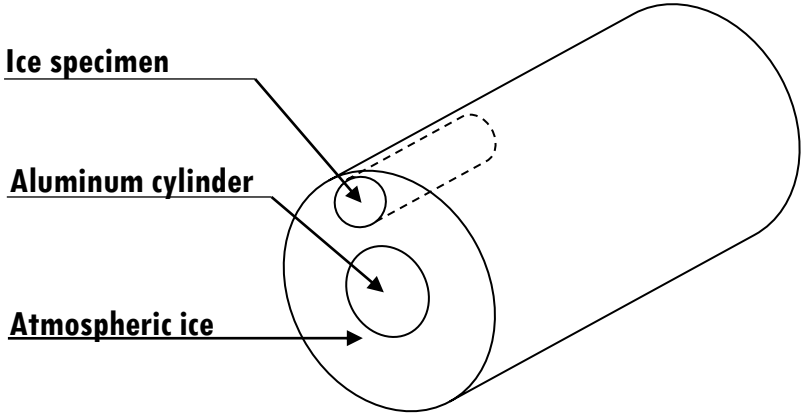
Ice shdding by melting

Ice shdding by sublimation

Ice shdding by mechanical breaking

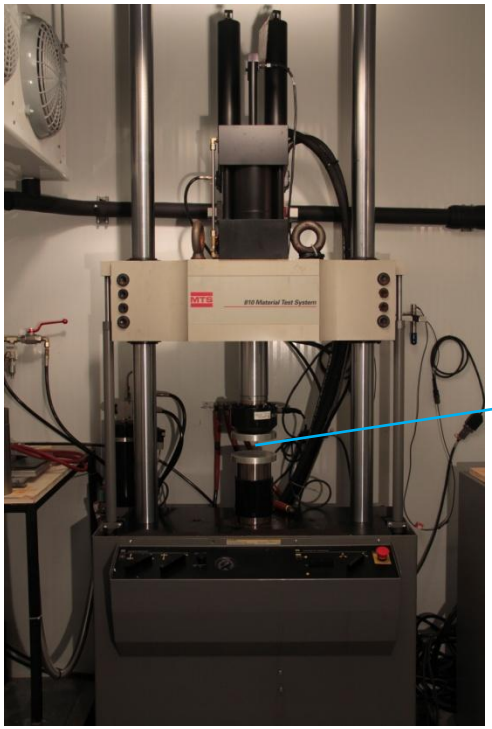
2. Experimental methodology

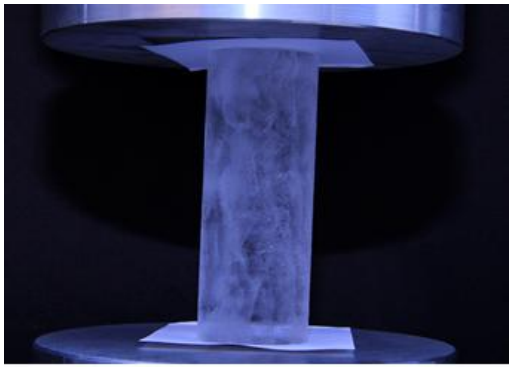




Accumulated atmospheric ice on the rotating cylinder, and Schematic illustration of accumulated atmospheric ice and the specimen cut

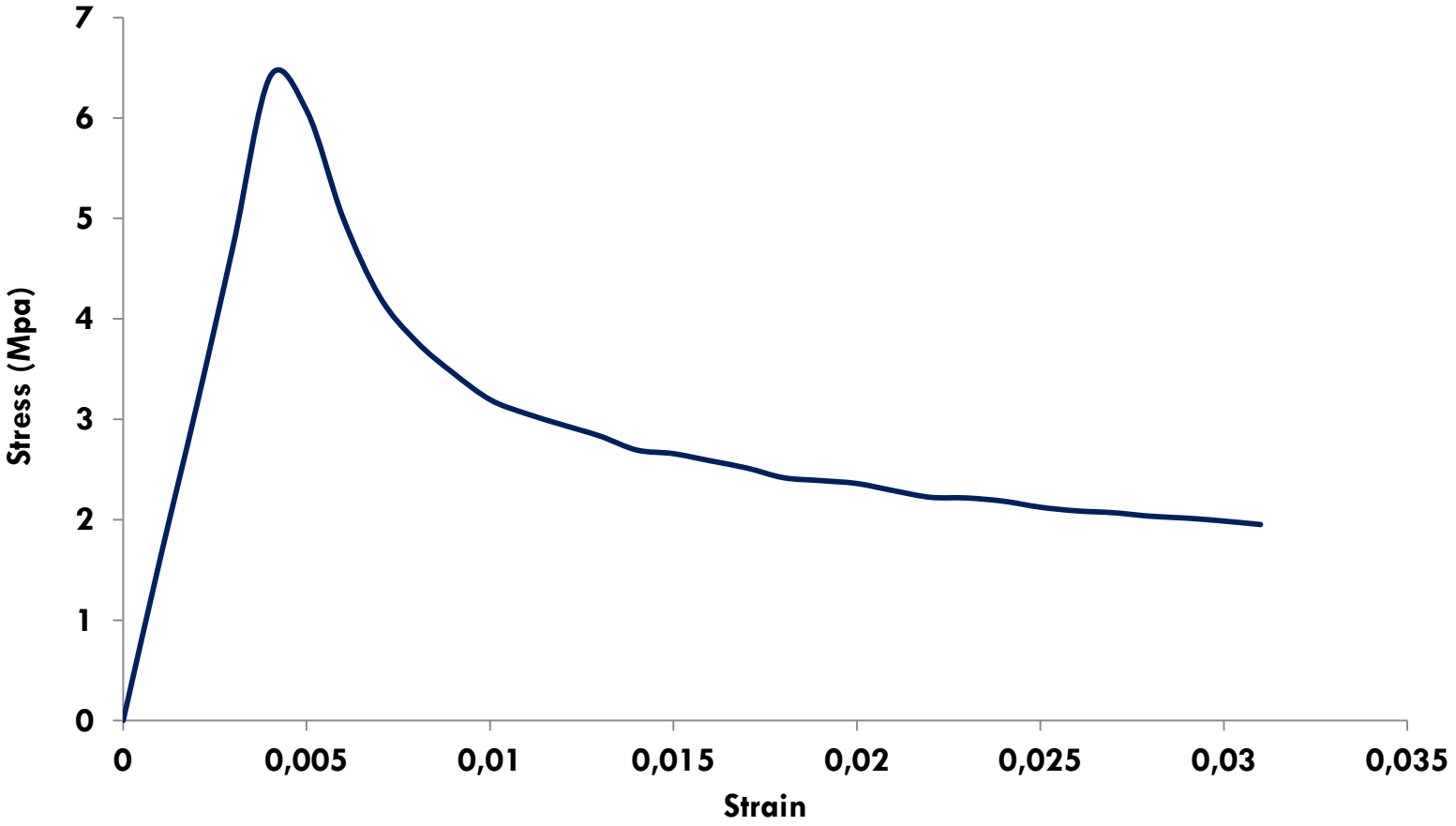
2. Experimental methodology





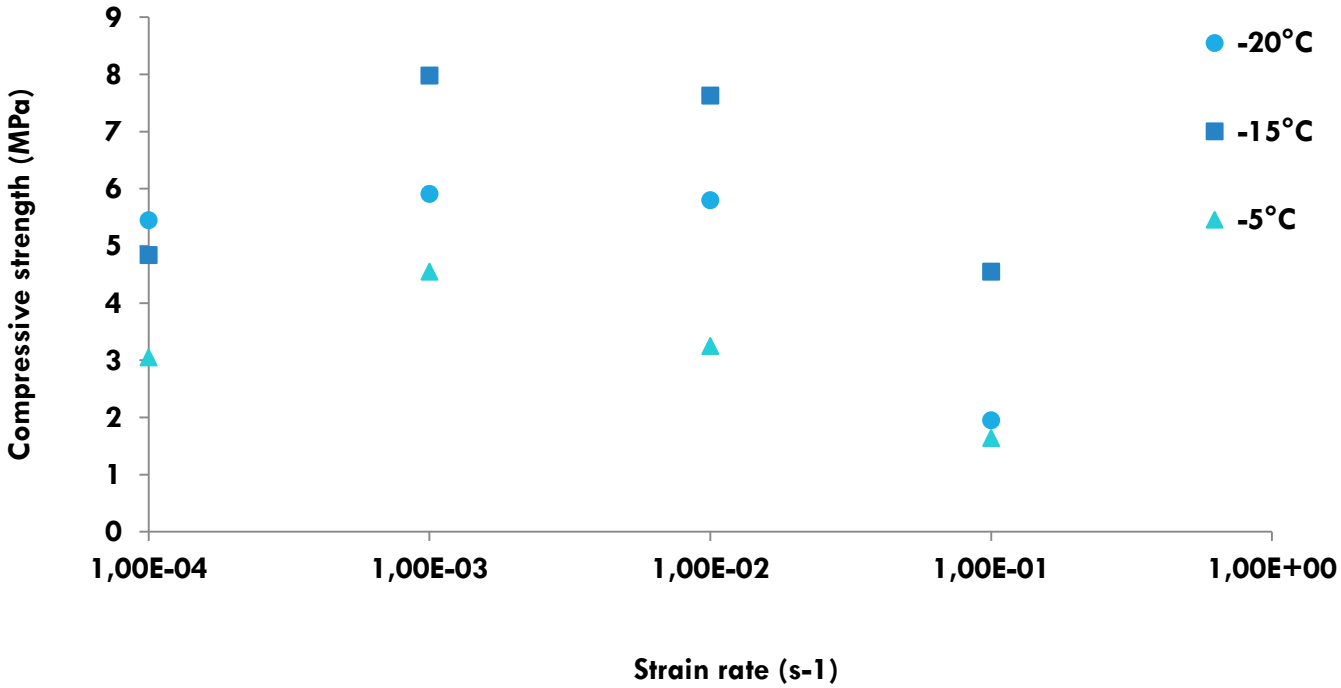
Closed-loop electrohydraulic testing machine (MTS 810)

2. Experimental methodology



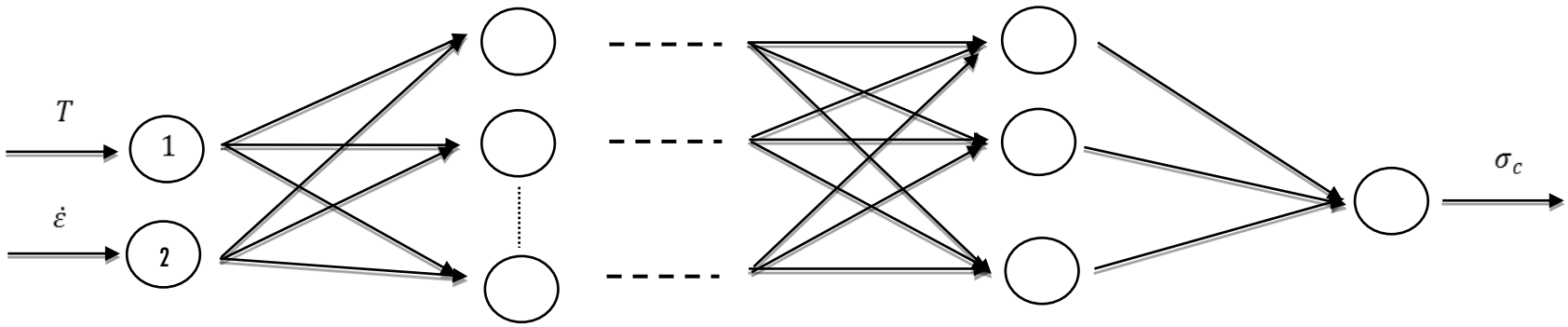
Stress-strain curve at -15°C with a strain rate of $10^{-4}s^{-1}$

2. Experimental methodology



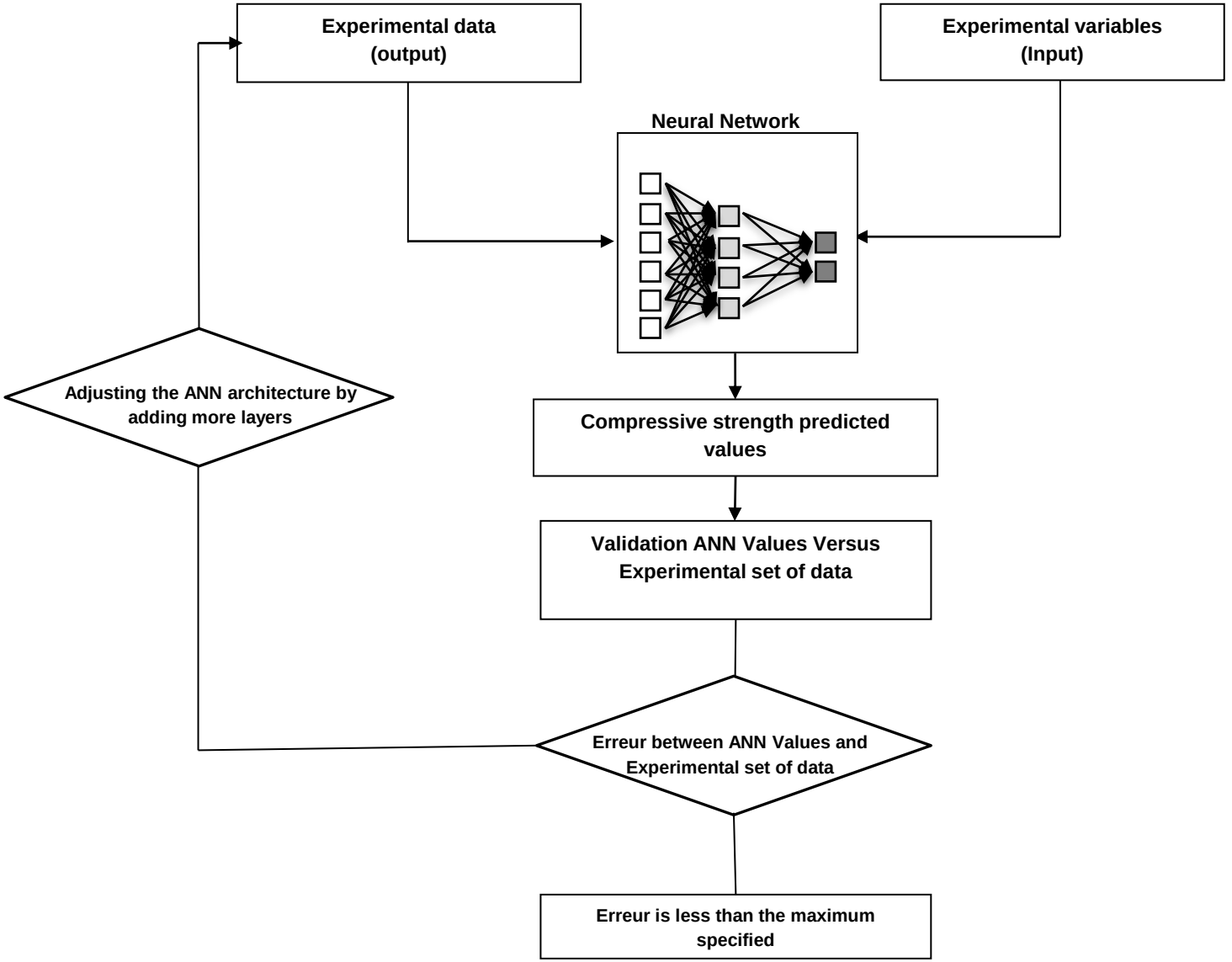
Compressive strength evolution versus strain rate for different temperatures

3. The Neural networks approach



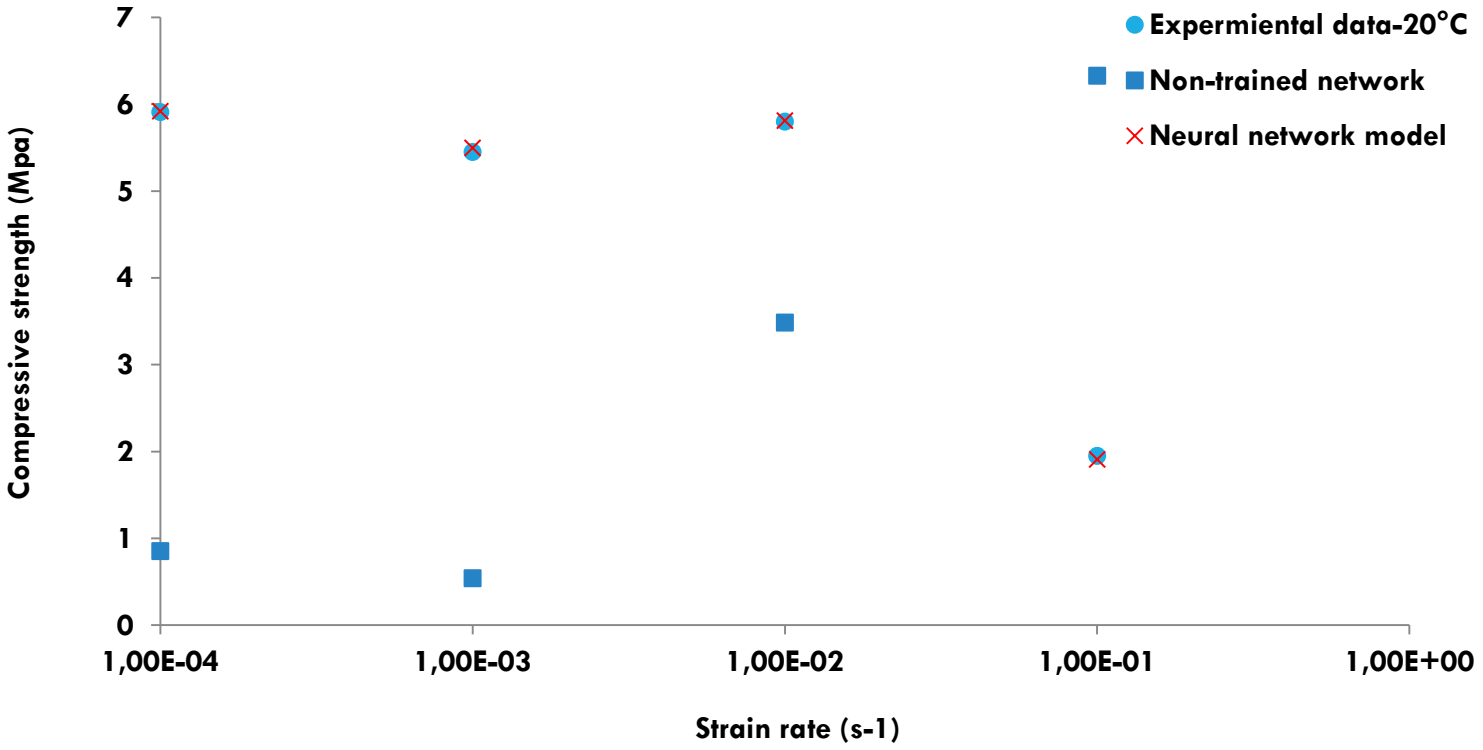
The architecture of the neural network model

3. The Neural networks approach



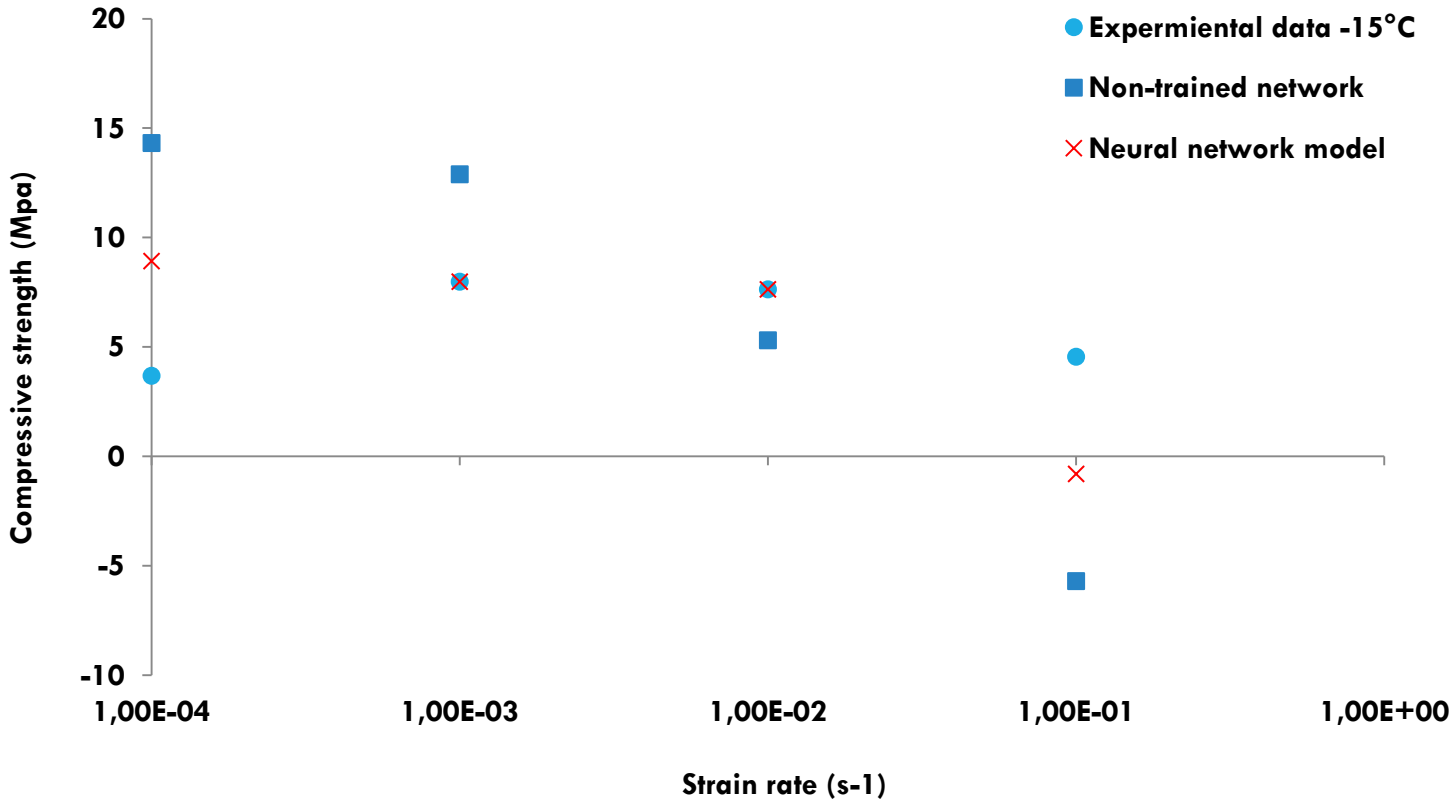
The neural network model algorithm

4. Results



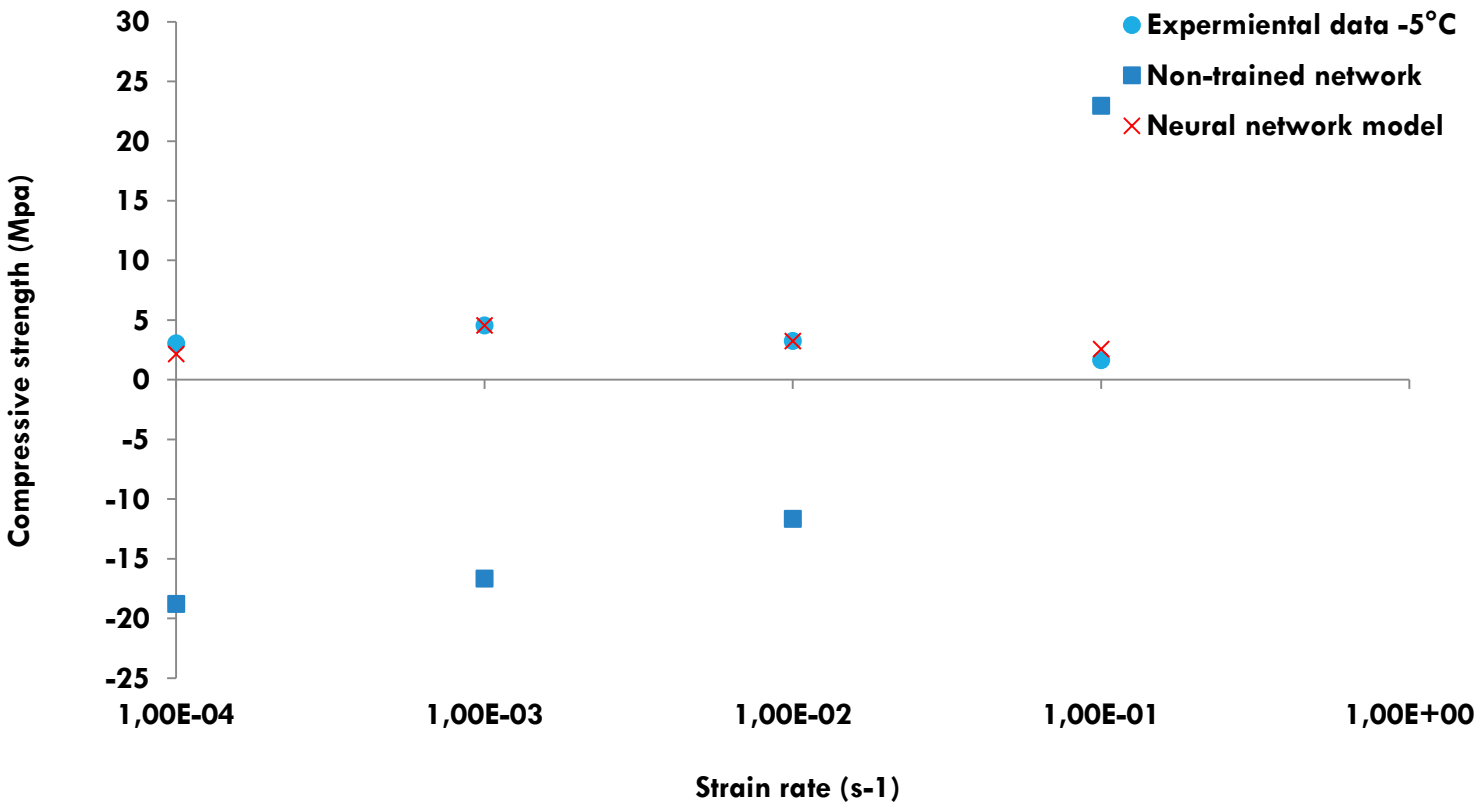
Predicted compressive strength at -20°C

4. Results



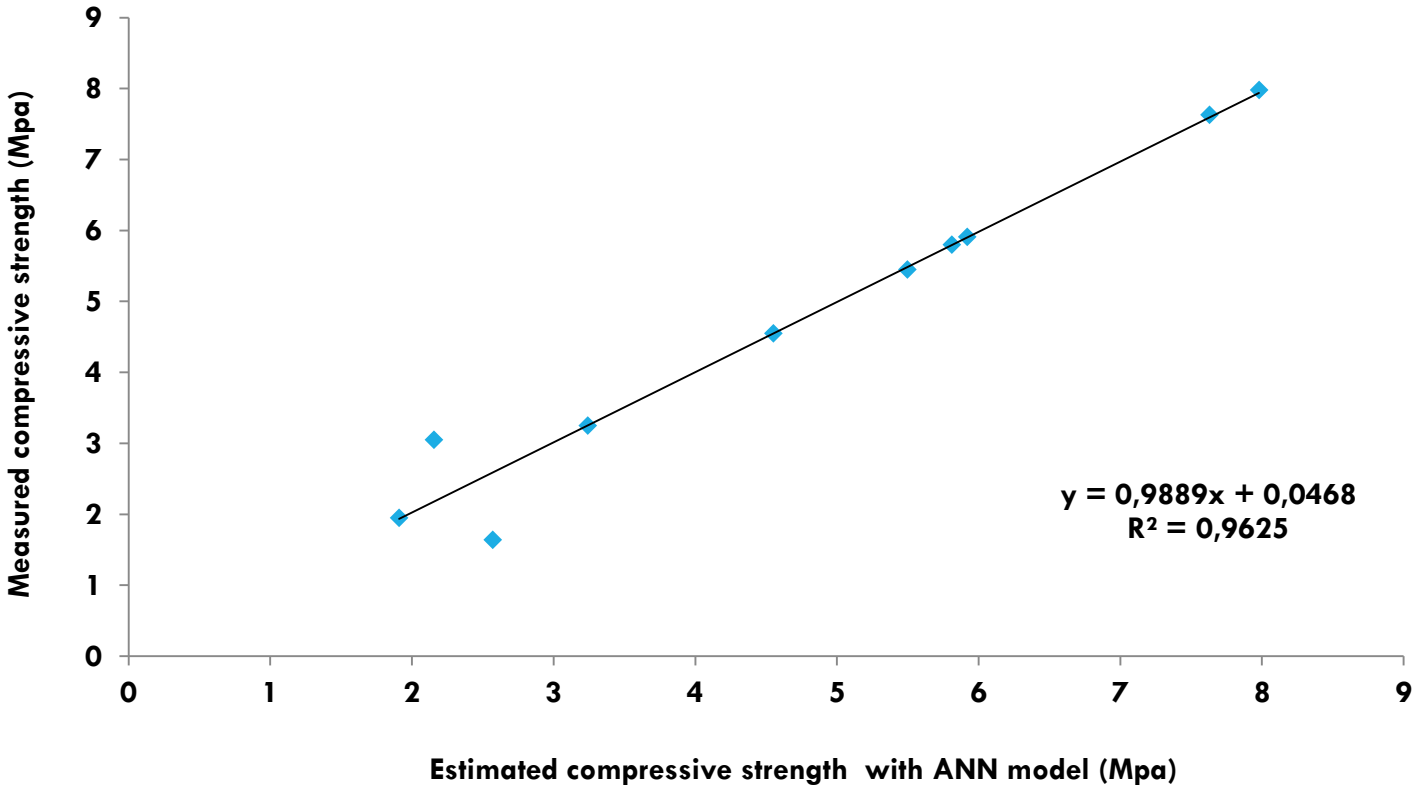
Predicted compressive strength at -15°C

4. Results



Predicted compressive strength at -5°C

4. Results



Comparison of the measured compressive strength and the estimated values by the ANN model

5. Summary

- The compressive strength of atmospheric ice depends highly on temperature and strain rate,
- The neural network approach presents good alternative to model the compressive strength of atmospheric ice,
- The relative error between the experimental data and the ANN values was 1.71 % for -20 °C, 5.37 % for -15 °C and 0.22 % for -5 °C.

مرسی

Merci

gracias

ありがとう

Vielen Dank

شكرا

dank u

thanks

ⵜⴰⵏⵎⵉⵔⵜ

grazie

Спасибо

σας ευχαριστώ

Tack