

The Cryosphere Discuss., referee comment RC1  
<https://doi.org/10.5194/tc-2021-108-RC1>, 2021  
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## Comment on tc-2021-108

Anonymous Referee #1

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Referee comment on "Effect of snowfall on changes in relative seismic velocity measured by ambient noise correlation" by Antoine Guillemot et al., The Cryosphere Discuss., <https://doi.org/10.5194/tc-2021-108-RC1>, 2021

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### General Comments

The article identifies relative changes in subsoil stress caused by the snow cover in its fresh and dry state (when it is melting). The authors use ambient seismic noise to calculate these changes using coda DV/V wave interferometry. The hypothesis is that the melting snow can percolate through the soil surface and increase the pore pressure and density, leading to possible mass slips.

The article is well structured and adequately written. A significant contribution is that experimental results can be correlated with numerical simulations, which show that relative stress changes can be reproduced for the two physical states of the snow cover.

The article can be accepted with minor corrections. I suggest a discussion of variations in dV/V estimation if atmospheric effects are taken into account. Also, the authors should include a figure showing the correlations obtained and indicating the part of the waveform in which the dV/V estimation is made. The authors assume that the coda is mainly composed of surface waves (not exist wave scattering). If this is not entirely true, then it should be discussed, as is the confrontation conducted in the modeling (section 4.1), where results are generated for Rayleigh waves.

### Specific comments

**Lines 80-90.** For the reader to visualize how the influence of the snowpack will be modeled, the authors must make a scheme that illustrates this procedure.

**Line 150.** Here's an error, the depth of research in the refraction study can't be the same as the length of the line.

**Line 200.** In this part, the authors consider  $dV/V$  calculations on surface waves, however. The previous section does not indicate if the analysis of  $dV / V$  involves direct surface waves or assumes that the correlograms' coda is composed purely of surface waves.