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An inversion method based on multi-angular approaches for estimating bare soil surface parameters from RADARSAT-1

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Abstract. The radar signal recorded by earth observation (EO) sat
sensitive to soil moisture and surface roughness, which both influe
onset of runoff.

This paper focuses on inversion of these parameters using a multi-
approach based on RADARSAT-1 data with incidence angles of 35°
(in mode S3 and S7). This inversion was performed with three bacl
models: Geometrical Optics Model (GOM), Oh Model (OM), and Mod
Dubois Model (MDM), which were compared to obtain the best
configuration. Mean absolute errors of 1.23, 1.12, and 2.08 cm for
roughness expressed in rms height and for dielectric constant, me
absolute errors of 2.46 – equal to 3.88 ($m^3\ m^{-3}$) in volumetric soil
moisture, – 4.95 – equal to 8.72 ($m^3\ m^{-3}$) in volumetric soil moistu
3.31 – equal to 6.03 ($m^3\ m^{-3}$) in volumetric soil moisture – were ol
for the MDM, GOM, and OM simulation, respectively. These results i
that the MDM provided the most accurate data with minimum error
Therefore, the latter inversion algorithm was applied to images, ar
final results are presented in two different maps showing pixel and
homogeneous zones for surface roughness and soil moisture.

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