



**HAL**  
open science

**Correction: Renard, P.; Ababou, R. Equivalent Permeability Tensor of Heterogeneous Media: Upscaling Methods and Criteria (Review and Analyses).  
Geosciences 2022, 12, 269**  
Philippe Renard, Rachid Ababou

► **To cite this version:**

Philippe Renard, Rachid Ababou. Correction: Renard, P.; Ababou, R. Equivalent Permeability Tensor of Heterogeneous Media: Upscaling Methods and Criteria (Review and Analyses). *Geosciences* 2022, 12, 269. *Geosciences*, 2023, 13 (8), pp.242. 10.3390/geosciences13080242 . hal-04338736

**HAL Id: hal-04338736**

**<https://ut3-toulouseinp.hal.science/hal-04338736v1>**

Submitted on 12 Dec 2023

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution 4.0 International License

Correction

# Correction: Renard, P.; Ababou, R. Equivalent Permeability Tensor of Heterogeneous Media: Upscaling Methods and Criteria (Review and Analyses). *Geosciences* 2022, 12, 269

Philippe Renard <sup>1,2,\*</sup>  and Rachid Ababou <sup>3</sup>

<sup>1</sup> Centre for Hydrogeology and Geothermics, University of Neuchâtel, Rue Emile-Argand 11, 2000 Neuchâtel, Switzerland

<sup>2</sup> Department of Geosciences, Sem Sælands vei, University of Oslo, 1 Geologibyngningen, 0371 Oslo, Norway

<sup>3</sup> Institut de Mécanique des Fluides de Toulouse, CNRS—University of Toulouse, 2 Allée Camille Soula, 31400 Toulouse, France; ababou@imft.fr

\* Correspondence: philippe.renard@unine.ch

The authors would like to correct the published article [1].

At the end of Section 4.2.3 in the original publication, Equation (88) and the paragraph preceding it were incorrect. This text and equation were supposed to introduce the Vectorial Surface Flux (VSF) equivalent permeability of a 2D fracture network, but the paragraph and the equation incorrectly referred to it the Net Surface Flux (NSF) criterion.

A correction has, therefore, been made at the end of Section 4.2.3. K from Vectorial Surface Flux (VSF), which is located in the first paragraph below the title Equivalent K with the VSF Criterion for a 2D Fracture Network (Summary), as follows:

In the case of a 2D fracture network, and for constant head gradient conditions (GRD), the equivalent permeability resulting from the VSF criterion is of the form:

$$\mathbf{K}_{VSF} = \frac{1}{2L} \mathbf{U} \cdot \left( \mathbf{S}_{DF} - \mathbf{S}_{DI} \mathbf{L}_{II}^{-1} \mathbf{L}_{IF} \right) \cdot \mathbf{X} \quad (88)$$

The rest of the text below Equation (88) remains unchanged, and the authors state that the scientific conclusions are unaffected. This correction was approved by the Academic Editor. The original publication has also been updated.

## Reference

1. Renard, P.; Ababou, R. Equivalent Permeability Tensor of Heterogeneous Media: Upscaling Methods and Criteria (Review and Analyses). *Geosciences* **2022**, *12*, 269. [[CrossRef](#)]

**Disclaimer/Publisher's Note:** The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.



**Citation:** Renard, P.; Ababou, R. Correction: Renard, P.; Ababou, R. Equivalent Permeability Tensor of Heterogeneous Media: Upscaling Methods and Criteria (Review and Analyses). *Geosciences* **2022**, *12*, 269. *Geosciences* **2023**, *13*, 242. <https://doi.org/10.3390/geosciences13080242>

Received: 17 July 2023

Accepted: 18 July 2023

Published: 11 August 2023



**Copyright:** © 2023 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).