

Geosci. Model Dev. Discuss., author comment AC1  
<https://doi.org/10.5194/gmd-2022-93-AC1>, 2022  
© Author(s) 2022. This work is distributed under  
the Creative Commons Attribution 4.0 License.

## Comment on gmd-2022-93

Markus Köhli et al.

---

Author comment on "URANOS v1.0 – the Ultra Rapid Adaptable Neutron-Only Simulation for Environmental Research" by Markus Köhli et al., Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2022-93-AC1>, 2022

---

This review targets the first part of the manuscript, especially regarding the technical aspects. It is posted by the author due to the discussion section already being closed.

The publication shows an profound knowledge of the authors about the existing programs and the underlying physics and IT concepts. There are, however, some points that would improve the document:

\* For people from other fields of research it is partly difficult to read, because the methods are not always described, e.g. half a sentence on how CRNS works would be helpful.

\* Similarly, there are terms used that are not common to all fields. They should either be explained or alias names added, especially

\* Is 'evaporation' of neutrons the same as 'spallation' of neutrons?

\* Is 'ray-casting' the same as 'ray-tracing'?

\* Equation (1) to (4) are only consistent, if (3) and (4) calculate  $p(x) dp$ , not  $p(x) dx$

\* In Eq.(5), the second  $\xi$  should be replaced by anything else, e.g.  $\xi'$ . As it is written now, the equation is not correct.

\* Surprisingly, it sounds like the authors have doubts about the Monte Carlo method.

\* Some suggestion for text improvement:

\* 47 – 49: can be omitted, as the programs are described in the following paragraphs

\* Chapter 1.2: it could be added that the programs dedicated to neutron instrumentation and virtual neutron experiments (McStas, VITESS, RESTRAX, ...) also allowed fast simulations by restricting its use to neutrons and ignoring nuclear reactions

- \* 106 – 112:: I cannot see the problem of the multigroup method
- \* 119: performance of GEANT4: what is missing, speed or accuracy or ...?
- \* 156 – 15: I don't understand that
- \* 214f: Why? What is done instead?
- \* 226: 'Whereas' -> 'While'

\* Style: often there are too few commas in too long sentences.

\* Figure 1:

- \* I wonders if neutrons are generated in the source or the soil layer.
- \* An explanation of the particle symbols and a vertical scale would be good

\* Figure 2:

- \* I think the 'Layer stack' is still a 'Neutron stack'.
- \* Is there no flight direction stored?