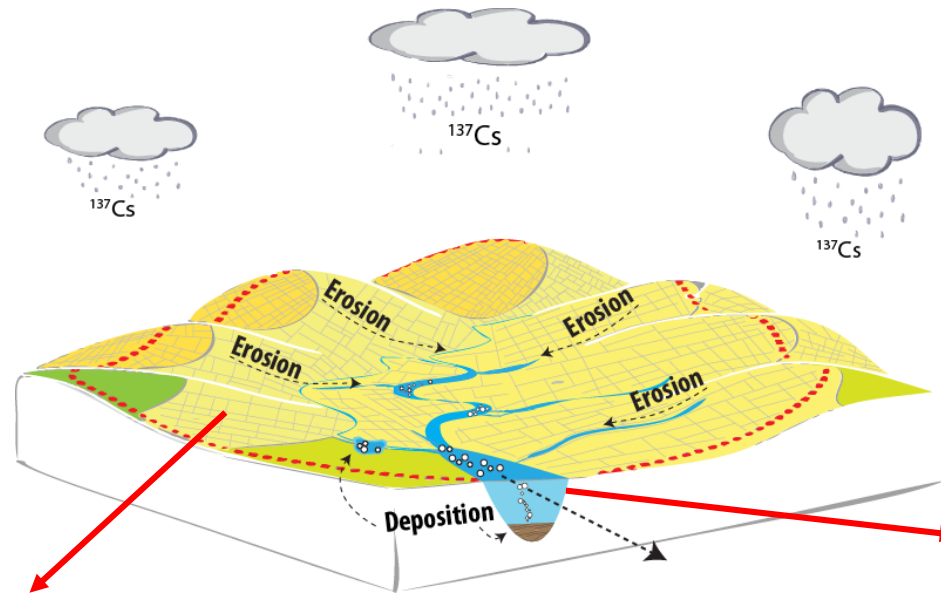# A synthesis of worldwide sediment source tracing research including fallout radiocesium (^{137}Cs)

Olivier Evrard, Pierre-Alexis Chaboche, Rafael Ramon, Anthony Foucher, and J. Patrick Laceby

EGU Sharing Geoscience Online May 2020

Introduction: using ^{137}Cs for discriminating the contribution of surface vs. subsurface sources to sediment
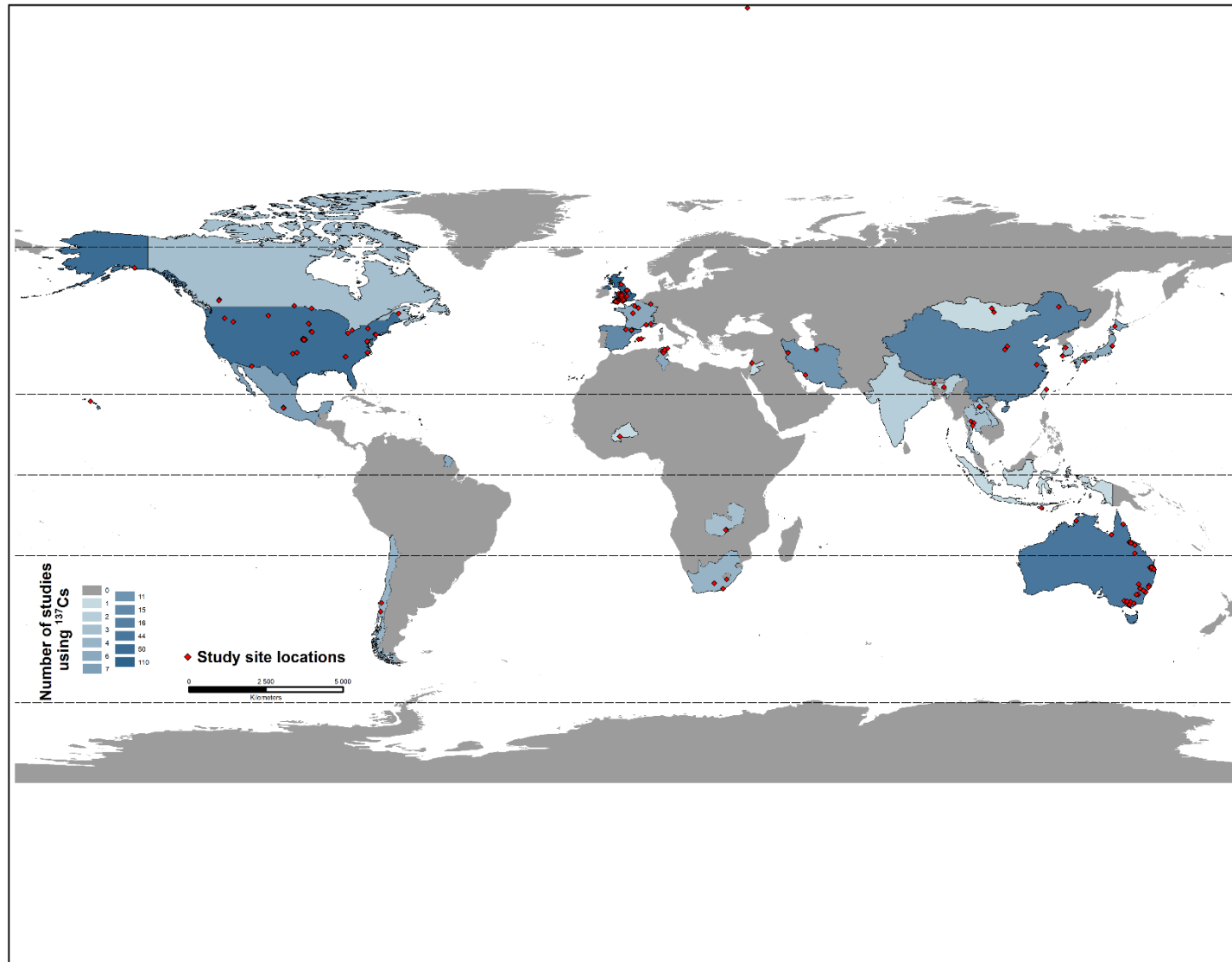

Surface erosion, delivering particles enriched in ^{137}Cs

Subsurface erosion, delivering particles depleted in ^{137}Cs

The meta-analysis compiled 123 articles considering ^{137}Cs for sediment tracing. 70% of these studies were conducted in Europe, North America and Australia.
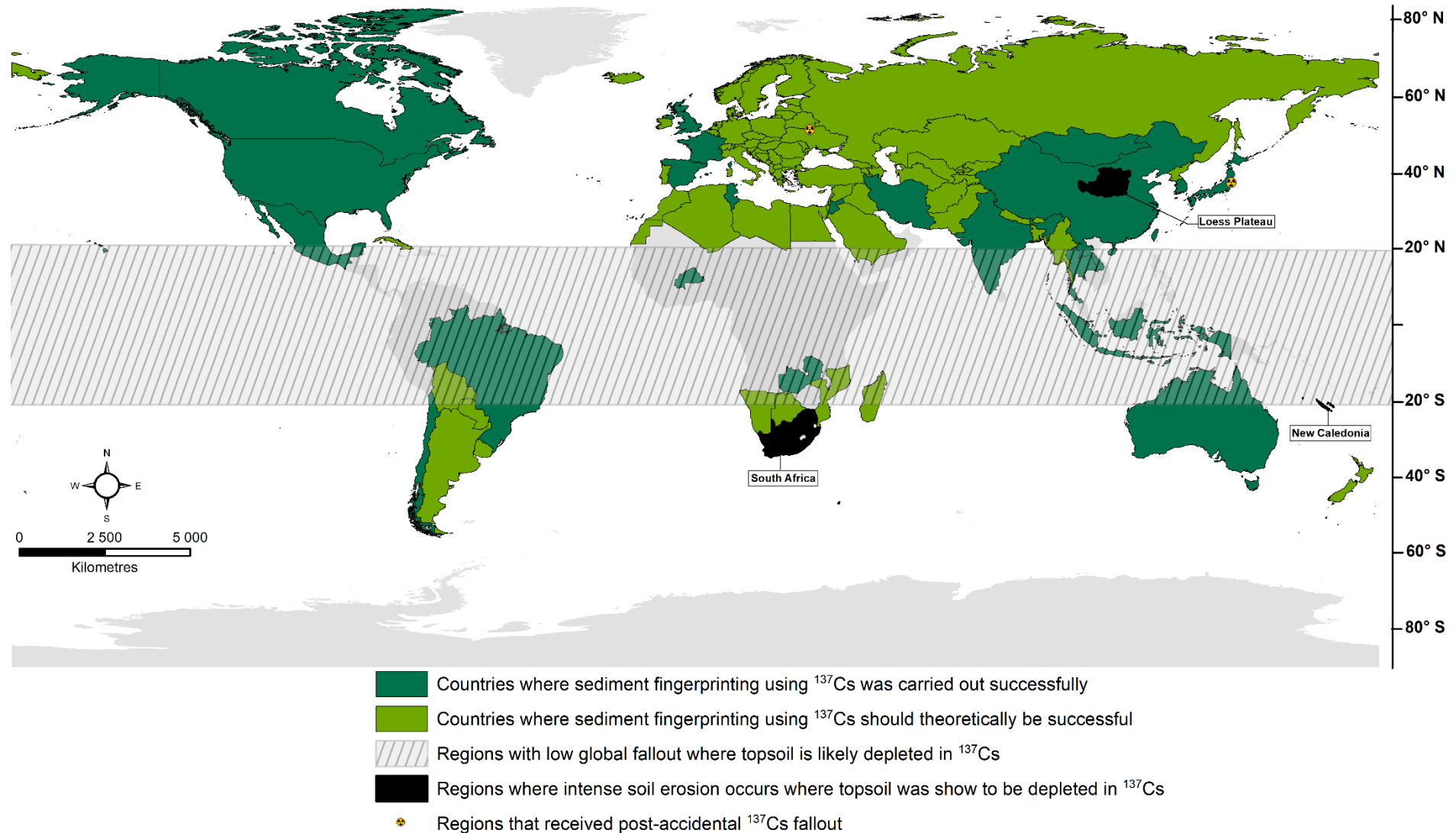
Expected contributions of this review article

1. Provide an **overview** of what has been done and what remains to be done;
2. Compile the **data** published and check how this data compilation is meaningful when examined at the global scale to discriminate between surface and surface sources;
3. List all the **other types of potential discriminations** that were achieved using ^{137}Cs as a tracer (land use, urban environments, etc.);
4. Think of potential **surrogate tracers** given the radioactive decay of ^{137}Cs.

This review also demonstrated the need to systematically provide basic catchment information and details on the sampling design when publishing sediment fingerprinting studies

The regions where ^{137}Cs should provide a useful tool to discriminate between surface and subsurface source contributions to sediment are outlined.

Legend:
- Countries where sediment fingerprinting using ^{137}Cs was carried out successfully
- Countries where sediment fingerprinting using ^{137}Cs should theoretically be successful
- Regions with low global fallout where topsoil is likely depleted in ^{137}Cs
- Regions where intense soil erosion occurs where topsoil was show to be depleted in ^{137}Cs
- Regions that received post-accidental ^{137}Cs fallout

Map labels: Loess Plateau, New Caledonia, South Africa

The article is currently freely available on-line:

https://doi.org/10.1016/j.geomorph.2020.107103

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Invited review

A global review of sediment source fingerprinting research incorporating fallout radiocesium (^{137}Cs)

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Any feedback on this work will be more than welcome !