

Clément Chabert's PhD Defense

Clement Chabert

Distributed modelling of erosion hazard in the Loire River basin and new perspectives of validation
The 13-12-2019at09h00

Members of the jury:

M Bas van Wesemael, Professeur, Université de Louvain, Belgique - Rapporteur

M. Oumarou Malam-Issa, Directeur de recherche, IRD, France - Rapporteur

Mme Christine Hatté, Directrice de recherche, CEA, France - Examineur

M. Claudy Jolivet, Ingénieur de recherche, INRA, France ? Examineur

M. Olivier Cerdan, Ingénieur de recherche, BRGM, France ? Co-Directeur de thèse

M. Olivier Evrard, Chercheur, CEA, France- Directeur de thèse

Summary :

Quantifying soil erosion in large river basins is a prerequisite to mitigate this process. Accordingly, the MESALES model estimating the erosion hazard in areas drained by water bodies was improved. Then, the potential of using radioactive fallout associated with the atmospheric nuclear tests conducted in the 1960s was tested. A map of the initial ^{137}Cs fallout was first built. Afterwards, the ^{137}Cs inventories were measured in the 359 soil profiles of the systematic soil quality monitoring network (Réseau de Mesures de la Qualité des Sols: RMQS). The mean soil redistribution rates of the 1954-2008 period were calculated. They showed an over-representation of accumulation sites among the RMQS and the difficulty to identify covariates allowing the estimation of the spatial distribution of these rates across large basins. Finally, the evolution of land cover and rainfall was reconstructed for the last 50 years in a plain cultivated sub-catchment. The outputs of the WaterSed erosion model showed a good agreement with those values estimated from the sediment archives collected in a pond at the outlet.

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