

— Spectral variations of underwater river sounds —

Passive acoustic monitoring of the self-generated noise of particle impacts has been shown to be correlated to bedload flux and bedload size. However, few studies have concentrated on the role of acoustic wave propagation in a river. For the first time, the river environment is modeled as a Pekeris waveguide, where a wave number integration technique is used to predict the transformation of sounds through their propagation paths. Focusing on the distance of a hydrophone from the channel bed and cutting off the low frequencies produced by impacts between gravel particles, we demonstrate that acoustic propagation modifies the spectral content of bedload-generated sound. Acoustic signals analyzed with the proposed model are interpreted by comparison to Helley- Smith bedload data obtained during flood conditions on the large gravel-bedded Arc-en-Maurienne River, France. This study shows that careful attention to acoustic propagation effects is required when estimating bedload grain size distribution with hydrophones in rivers, especially for rivers with slopes higher than 1%. Bedload monitoring with a hydrophone is particularly appropriate for large gravel-bed rivers - especially so during large floods, when in situ sampling is difficult or impractical and the impact of acoustic propagation is weaker relative to the self-generated noise of bedload impacts.

Auteurs du document : Geay, T., Belleudy, P., Laronne, J.B., Camenen, B., Gervaise, C.

Mots clés : SURVEILLANCE, ACOUSTIQUE, LIT DE COURS D'EAU, PROPAGATION D'ONDES ACOUSTIQUES, BEDLOAD MONITORING, HYDROPHONE, PASSIVE ACOUSTICS, RIVER SOUNDSCAPE, ACOUSTIC WAVEGUIDE, monitoring, acoustics, stream bed

Date : 2017

Format : text/xml

Source : 49466

Langue : Inconnu

Droits d'utilisation : Date de dépôt: 2017-11-22 - Tous les documents et informations contenus dans la base CemOA Publications sont protégés en vertu du droit de propriété intellectuelle, en particulier par le droit d'auteur. La personne consultant la base CemOA Publications peut visualiser, reproduire, ou stocker des copies des publications, à condition que l'information soit seulement pour son usage personnel et non commercial. L'utilisation des travaux universitaires est soumise à autorisation préalable de leurs auteurs. Toute information relative au signalement d'une publication contenue dans CemOA Publications doit inclure la citation bibliographique usuelle : Nom du ou des auteurs, titre et source du document, date et URL de la notice (dc_identifier).

Télécharger les documents : <https://irsteadoc.irstea.fr/cemoa/PUB00055785>

Permalien : <https://www.documentation.eauetbiodiversite.fr/notice/spectral-variations-of-underwater-river-sounds0>

Evaluer cette notice: