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SPATIAL VARIABILITY OF NEAR-SOURCE SEISMIC GROUND MOTION WITH RESPECT TO DIFFERENT DISTANCE METRICS, WITH SPECIAL EMPHASIS ON MAY 29 2012 PO PLAIN EARTHQUAKE, ITALY

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ABSTRACT

In near-source conditions, earthquake ground motion may illustrate specific features such as long-period velocity pulses and directivity. One of the main features in characterization of ground motion in near-fault conditions is its spatial variability not only as a function of random variations of Fourier amplitude and phase, as it is usually considered in engineering practice, but also depending on physical constrains referring to the seismic source characteristics (fault geometry, kinematics of slip) and the interaction with the site conditions. In order to be able to predict reliably the earthquake ground motion and to simulate the combined effects of the near-source conditions and the site effects induced by complex geological structures, there is a certain need of using large size 3D numerical simulations. Therefore, this paper aims at illustrating the spatial variability of seismic motion predicted by a deterministic physics-based numerical study with emphasis on the sites affected by the Po Plain earthquake of 29 May 2012. Such a study is intended to illustrate the variability of peak ground motion with respect to different distance metrics available in the literature as well as proposing a new metric which can decrease the variability of results and the corresponding inter-event residuals significantly. Finally the results will be compared with the strong ground motions recordings obtained during M_w6.0 29 May 2012 earthquake.

INTRODUCTION

The earthquake ground motion in near-fault condition is known to have different specific characteristics in terms of amplitude, duration and frequency content. One of the main issues corresponding to near-fault earthquake ground response is the spatial variability of seismic ground motion. This denotes the