ATTENUATION CHARACTERISTICS OF SEISMIC GROUND MOTION IN THE 1995 HYOGOKEN-NAMBU EARTHQUAKE

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ABSTRACT

The recorded ground motion of the 1995 Hyogoken-nambu Earthquake are used to study the attenuation characteristics of near-field ground motion. The peak ground accelerations and velocities are compared to the attenuation relations derived from far-field data recorded from 76 JMA stations. Although the near-field data used include non-JMA stations, the peak ground motion data have a relatively good fit to the far-field attenuation relations. Saturation of the peak ground motion near the fault was examined by introducing a distance saturation parameter to the attenuation relations and performing a non-linear least squares analysis on the Hyogoken-nambu Earthquake data. Since the data used are from a single event, the magnitude independence of the PGA cannot be determined. However, the fit of the recorded data in the near-field is improved. The resulting attenuation relations for the Hyogoken-nambu Earthquake are given by:

$$log_{10} PGA = 0.322 + 0.477M_J - log_{10} (r+3.8) - 0.00144r + 0.00311h$$

$$log_{10} PGV = -1.576 + 0.628M_J - log_{10} (r+7.0) - 0.00130r + 0.00222h$$

where PGA (cm/s^2) and PGV (cm/s) are the larger of the peak accelerations and velocities from two horizontal components, M_J is the JMA magnitude, r is the closest distance to the fault rupture, and h is the depth of the point in the fault rupture where r is measured.

1. INTRODUCTION

An earthquake with a magnitude of 7.2 in the Japan Meteorological Agency (JMA) scale occurred in the vicinity of Kobe on January 17, 1995. It is the most destructive earthquake in Japan since the 1923 event (AIJ, 1995; EERI, 1995). Kobe is one of the oldest and important economic hub