Abstract
Adriatic sea sediment cores were sampled during a series of cruises by box corer. The activities of $^{40}$K, $^{226}$Ra, $^{228}$Ra and $^{238}$U were determined by gamma-spectrometry. Activities of these naturally-occurring radionuclides are generally high in pelitic sediments, whereas the lowest concentrations correspond to sands and silts which are mainly spread along the Croatian coast. $^{228}$Ra distribution generally follows the distribution of uranium, and $^{40}$K and $^{226}$Ra distributions are strongly influenced and governed by grain size distribution which is, in fact, the clay mineral content of these sediments. Radionuclide concentrations are generally lower in sediments with higher carbonate content.

Key-words: radioactivity, sedimentation, geochemistry, Adriatic Sea

Introduction
The content of naturally occurring radionuclides in different types of recent Adriatic sediments in Croatian territorial waters has not yet been studied. The purpose of this study was to give the very first insight into the spatial distribution of natural radionuclides in Adriatic sea sediments. The shallowness of continental shelf and solid discharges from Po and other Italian and Croatian rivers have a strong influence on the grain size distribution and sedimentation rate. The Po River carries siliceous material from igneous and metamorphic rocks, and to a lesser extent, detrital carbonates from central and western parts of the Alps and from central Apennines. Erosion of the red soil (terra rossa) and the biogenic destruction of calcareous shells provide the material which has settled along the Croatian coast. Biogenic carbonates are produced throughout the area, but they are important sediment constituents only in areas where the input of terrigenous matter is negligible.

Due to the longshore current and wave transport, a narrow littoral belt of coarser and finer sand above the wave base is formed, spreading along the western and north-western Adriatic coast. The pelitic material continues north-eastward until the Adriatic drift current prevails and changes its direction to the south. Because of that, pelitic material has settled in a belt below the wave base parallel to the Italian coast [1]. In the offshore direction (where minor quantities of fine-grained material settle) pelites are mixed with older sands by means of bioturbation and resuspension, resulting in sediments characterised by a wide range of grain size: from clayey silt to silty sand [2, 3]. Part of the north central Adriatic shelf is covered with relic sands deposited as shore sands during the Holocene transgression. Similar deficiency of clastic material input prevail along the Croatian coast. There are no large rivers draining these terrains, and the relatively small quantities of material that the eastern Adriatic rivers carry (Mira, Rasa, Zrmanja, Krka) are deposited in their estuaries [2, 4]. Cetina and Neretva rivers carry significant quantities of material, but due to the semi-enclosed nature of the sea, recent sedimentation of terrigenous material is restricted to relatively small deltaic (Neretva) or estuarine (Cetina) sedimentation areas. The central Adriatic is a shelf edge covered mostly by mud. In this part the sedimentary supply is both longitudinal and lateral, and the distribution of the material is governed by marine agents [3, 5].

Sampling and methods
Cores of open Adriatic bottom sediments were sampled by box corer during the ASCOP 16 cruise in summer 1990. Cores were taken along seven different transects between the borders of Croatian and Italian territorial waters in the northern and central Adriatic Sea (Fig. 1). The sediments along the Croatian coast between Rijeka and Dubrovnik were taken by drop or vibro corer during summer and autumn 1993. Drop corer was used for collecting samples in sedimentation areas of the Cetina and Neretva river mouths in autumn 1994.

After sampling, the sediments were frozen at -18°C and kept until further use. Before the analyses, the samples were thawed at room temperature and dried at 106°C to the constant weight. Two core sections of open Adriatic and the Po River prodeltaic sediments were analysed: 0-3 cm and 12-15 cm. Only surface sections (mainly the first 20 or 30 cm) of cores taken along Croatian coast were analysed. Cores...