Summary: The investigated region covers the territories of Bulgaria, Czechoslovakia, the G.D.R., Hungary, Moldavia, Poland, Romania and the south-western Ukraine and parts of Austria, Greece, and Yugoslavia. Maps of epicentres demonstrate the geographical distribution of activity. Earthquakes occur in several seismogenic belts (provinces) related to neotectonic features of the region. A special phenomenon is the intermediate-depth focus of Vrancea releasing in the region the largest amounts of energy, together with a few crustal foci in Bulgaria.

For the study of recent and contemporary tectonic processes manifested, by among other phenomena, earthquakes, seismological information covering the longest possible period is needed. Seventy years of instrumental observations are sufficient to solve some simplified statistical problems in very active regions, however, in all regions macroseismic information from years prior to 1901 must be included in any speculation about the location of earthquake zones. Even then, we have to work with simple analogies, assume a continuity and stability of processes and combine seismological data with all available geological and geophysical information in attempting to delineate earthquake zones and to estimate their levels of activity.

The seismotectonic analysis can be based on various maps, e.g., maps of epicentres, maps of maximum observed intensity, fault plane solutions, map of tectonic regionalization, neotectonic map, seismogenetic map derived from geological criteria.

The present contribution introduces the first versions of epicentre maps, which were prepared for a general review of seismicity of the Central and Eastern Europe investigated within the K.A.P.G. programme (K.A.P.G. — Commission of Academies of Sciences of Socialist Countries for Planetary Geophysical Research). The investigated region includes the territories of Bulgaria, Czechoslovakia, the German Democratic Republic, Hungary, Poland, Romania and the SW part of the Soviet Union, defined by the geographic coordinates: 55°N—30°E, 41°N—30°E, 41°N—22°E, 44°N—22°E, 44°N—20°E, 45°N—20°E, 45°N—16°E, 48°N—10°E and 55°N—10°E (see the dashed line in the maps.). This region includes also parts of Austria, of the Federal Republic of Germany, of Greece and of Yugoslavia, because the earthquake belts cannot be cut off at the national frontiers and because some foci from the neighbouring countries are strongly felt in the K.A.P.G. countries.

Two maps of epicentres were compiled originally on a scale of 1:2.5 million using data from the main part of the K.A.P.G. Catalogue of Earthquakes for Central and Eastern Europe [1]; its preparation has also been recommended by the K.A.P.G. programme. The International Tectonic Map of Europe and Adjacent Areas, scale 1:2 500 000 [2], was used as the base in order to facilitate the comparison between geological and seismological phenomena.

The first map (Fig. 1 — see Supplement p. 204a) contains epicentres of historical earthquakes with I ≥ VIII prior to 1800 and I ≥ VII for the period 1801—1900 in accordance with the estimated limits of homogeneity of the Catalogue. The map distinguishes intensity classes from VII to XI, expressed in terms of the MSK-64 scale and three classes of focal depth. Each intensity and depth class is appropriately marked in the map. Circles denote shallow foci within the Earth's crust, 4 < h ≤ 60 km, triangles intermediate depth foci between 60 and 300 km and squares

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denote very shallow foci located presumably within the sedimentary layers (1 < h ≤ 4 km). The
total number of earthquakes at one point, belonging to a certain magnitude class, is indicated
by a number at the corresponding mark.

For the historical period there are some events of doubtful epicentral location; e. g., she reports
on damaging shocks during 1441 — 1443 indicate the possibility of two foci, one in Lower Silesia
and one in Central Slovakia. However, only the focus in Silesia is marked in the map, because
it was determined by Polish seismologists, in Slovakia the epicentre has been left out because
of the large uncertainty about the position of the epicentre (perhaps φ = 48°7', λ = 19°37'), the
number of reports being too small. Reliable localization of these strong earthquakes from 1441
to 1443 remains, therefore, open. Another difficulty is presented by large single earthquakes,
e.g., west of Vienna (Neulengbach) or near Komárno, which demonstrate one outburst of seismic
energy in history and do not permit any recurrence interval to be estimated. By comparing both
maps one observes a relative lack of historical epicentres in Bulgaria compared with the high
activity of the 20th century. This absence of data may be partly caused by incomplete reports.

The second map (Fig. 2 — see Supplement p. 204b) contains epicentres plotted for the period
1901—1972 and M ≥ 4 or I ≥ V, the quantity M-magnitude was chosen as the basic measure of
the size of earthquakes in the map. The following magnitude classes with a step of 0.5 were used:
≤4-0, 4-1—4-6, 4-7—5-1, 5-2—5-6, 5-7—6-2, 6-3—6-7, 6-8—7-2 and ≥7-3. Each class is differ-
tently marked in the map, which also applies to the class of the focal depth. The magnitudes
based on surface waves MLH were taken as representative values for shallow earthquakes and
those based on body waves (M_B = m) for intermediate-depth ones. It must be noted that in
the regions of high density of epicentres some low magnitude shocks (e.g., in Vrancea or in
Bulgaria) cannot be simply plotted at one point of the map; these omissions, however, do not
influence the pattern.

There are large differences in the level of earthquake activity over the investigated area. It is
also evident that the 20th century map cannot give a complete idea of the position of earthquake
foci particularly in the northwestern part of the area. There were damaging earthquakes in some
sections of the Carpathian system prior to 1900 and very low or no activity in the 20th century.
Only the combination of both maps can provide a better insight into the problem of delineation
of active earthquake regions.

Combining the distribution of epicentres in both maps, first of all the striking difference in the
activity between the Bohemian Massif of Hercynian era and the Alpine Carpathian and Rhodope
systems is evident. In the whole investigated area two source regions of the highest seismic energy
release exist: the Struma valley with the largest European shallow shock of the 20th century
(Apr. 4, 1904, M = 7½) and the Vrancea intermediate-depth focus with several earthquakes
of m = 7—7½ occurring, on an average, twice a century. Large shallow earthquakes also occurred
in Central and Eastern Bulgaria during the first 30 years of the 20th century and at the boundary
of the Pannonian Basin, if we consider the whole observation period of 6—7 centuries.

All investigated foci, except that of Vrancea, are located within the Earth's crust, the majority
of them is situated in its upper part. The "seismic active layer", i.e. the layer comprising earth-
quake foci, is thicker in the northern part of the Western Carpathians, at the eastern boundary
of the Pannonian Basin and in the Rhodope Mts.

Some epicentres follow distinct earthquake belts, which are well obse. as if we also include
epicentres from neighbouring areas. One of the belts coincides with the so called Insubric zone
extending from Friuli to Vienna and from there following the trend of the West Carpathians.
This belt can also be followed to the western section of the Eastern Carpathians. There is, however,
an activity gap in the central part of the Carpathians north of Vrancea.

The Vardar zone as a seismotectonic belt of the first order can be extended with some imagina-
tion in the direction of Budapest; a transversal belt enters our area from Yugoslavia towards
Lake Balaton. The relation of earthquake activity with main tectonic lineaments is evident and

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