

3-7-3 Survey Results

For detailed analysis of this geochemical survey, we need to obtain the data of geochemical compositions of intrusive rocks (Paraná flood basalt: such as sills and dykes), and sedimentary rocks (sedimentary rocks of Paraná basin: such as coal bed, quartzite, etc.) distributed in this survey area. However, because that is difficult, this survey was limited to discussions of geochemical characteristics of the southern part in the Lomba Grande district.

(1) Results of the Geochemical Survey by Stream water

Fig. II-3-7-1 to Fig. II-3-7-4 show the results of the geochemical survey by stream water. Analysis results of Cu, Ni, Co, and SO₄ in stream water indicate low values, which are characteristic of river water in general (Rose et al., 1979; Levinson, 1980).

However, some of the samples indicated relatively high values. Such examples include CK-A-01 (Cu: 10.36 ppb, Zn: 23.43 ppb, Pb: 44.55 ppb, Sn: 33.95 ppb, W: 0.8 ppb), which were collected near Santa Tecla in the southeastern part of the geochemical survey area, and CK-A-161 (Ni: 33.44 ppb, Zn: 55.64 ppb) and CK-A-163 (Cu: 77.44 ppb), both of which were collected near Passo da Taquare.

These samples were collected at the surface above the sills recognized by past drillings. One of these samples is corresponding to the sills contained high Mg and Ca value. These anomalous value of stream water may indicate background values between of different basic intrusive rocks.

The results of measuring of SO₄ in the stream water indicate that samples of a relatively high value concentrate in the northwestern part of the geochemical survey area; two samples of stream water indicated a particularly high value of SO₄ content (CK-A-06: 26 ppm, CK-A-08: 51.6 ppm). This may indicate that the neighboring intrusive rocks contain sulfides. Anomalous conditions of Ni, Cu and SO₄ in the stream water may be interpreted by using analytical data of drilling cores in the geochemical survey area.

(2) Geochemical Survey of the Stream Sediments

Fig. II-3-7-5 and Fig. II-3-7-6 show the results of the geochemical survey of stream sediments. Areas of indicating high contents of metallic elements are extracted by geochemical survey of stream sediments. In particular, CK-S-08 and CK-S-16, which were collected at marginal parts of the Lomba Grande intrusive rocks, indicated high values of analysis; the analytical values of CK-S-08 indicated Cu: 26 ppm, Mn: 799 ppm, Ni: 227 ppm, Zn: 34 ppm, Co: 46 ppm, and Mg: 3.88 % meanwhile the analytical values of CK-S-16 indicated Cu: 30 ppm, Ni: 36 ppm, Co: 19 ppm, Ba: 121 ppm, and Cr: 146 ppm.

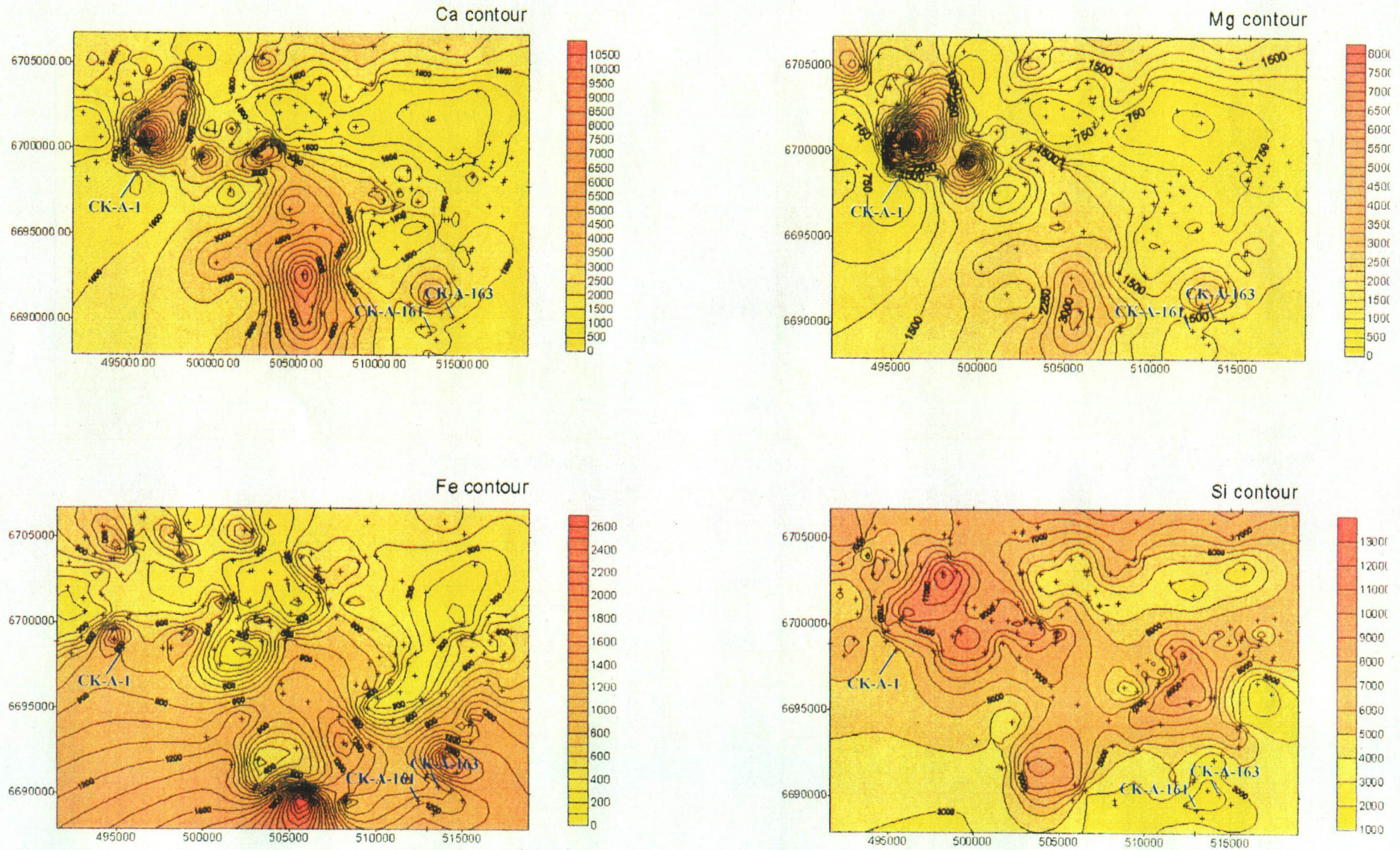


Fig. II-3-7-1 Contour map of Ca, Mg, Fe and Si for stream water in Lomba Grande district

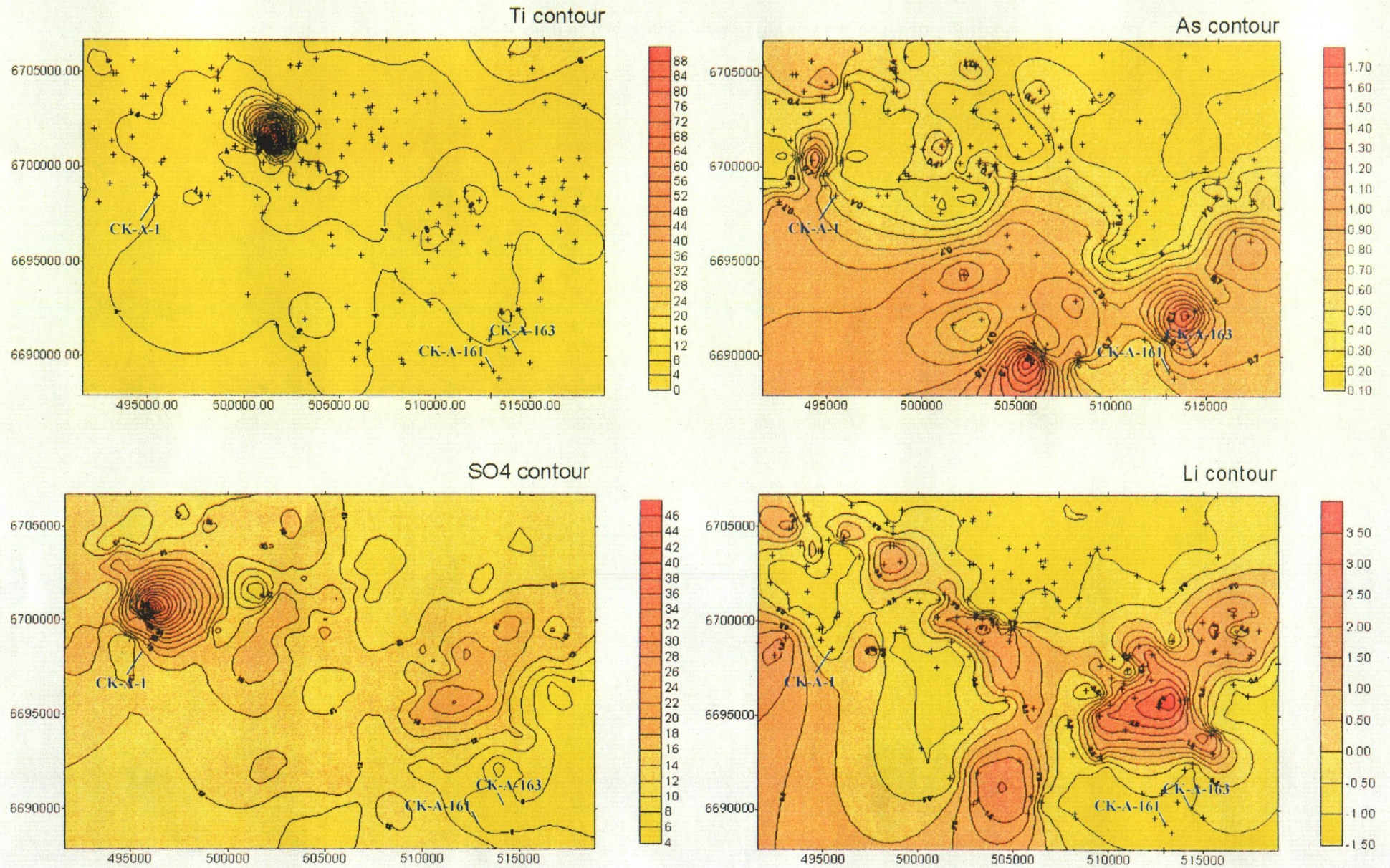


Fig. II-3-7-2 Contour map of Ti, As, SO₄ and Li for stream water in Lomba Grande district

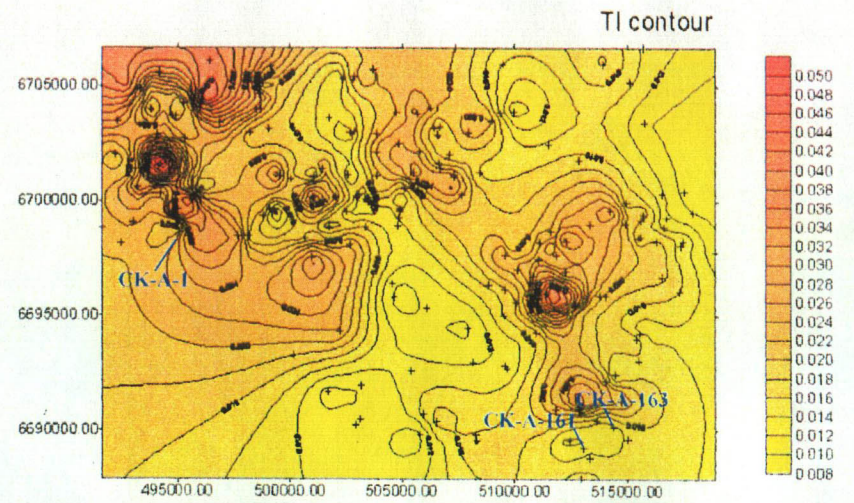
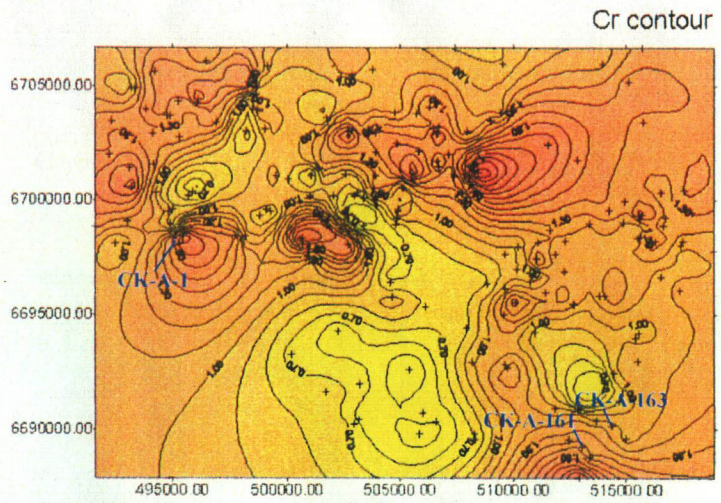
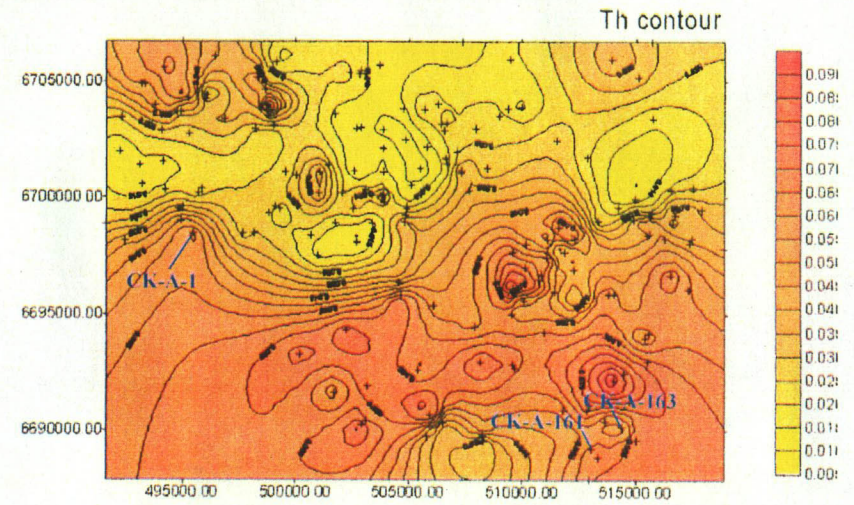
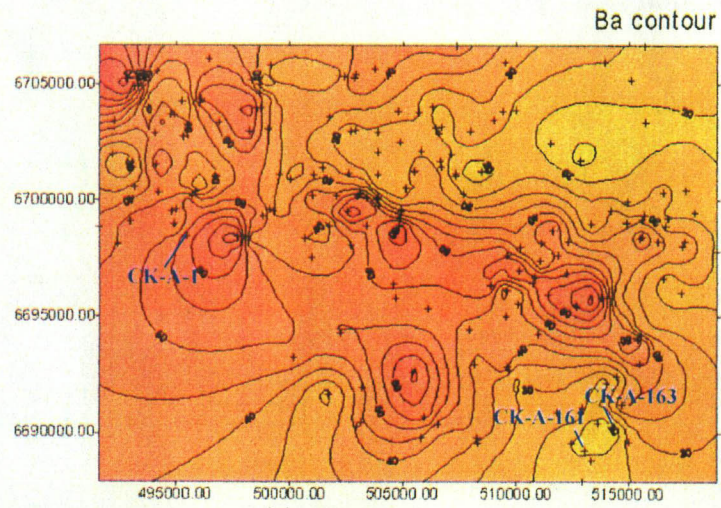


Fig. II-3-7-3 Contour map of Ba, Th, Cr and Tl for stream water in Lomba Grande district

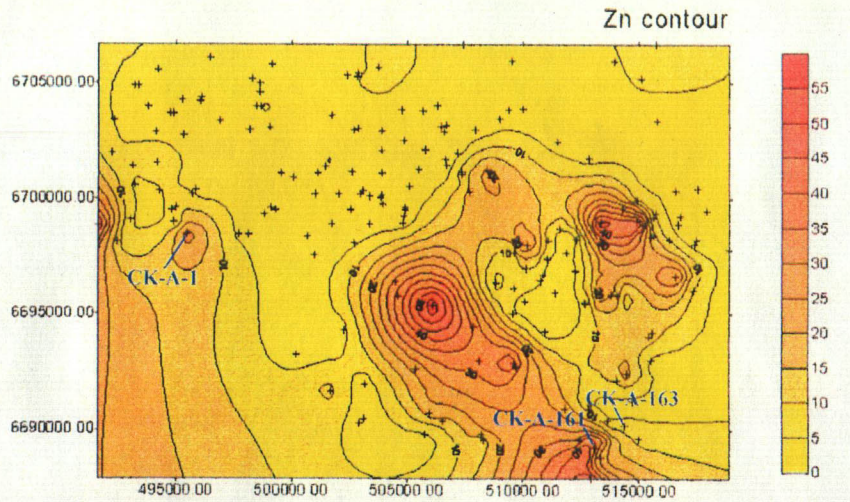
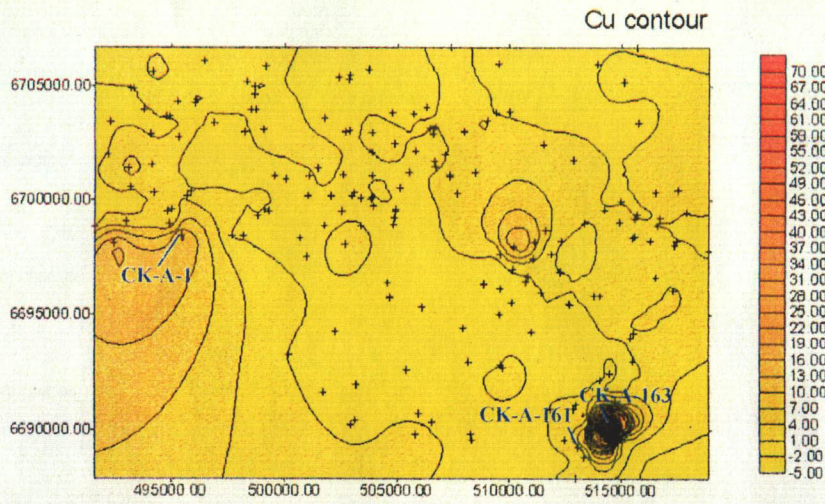
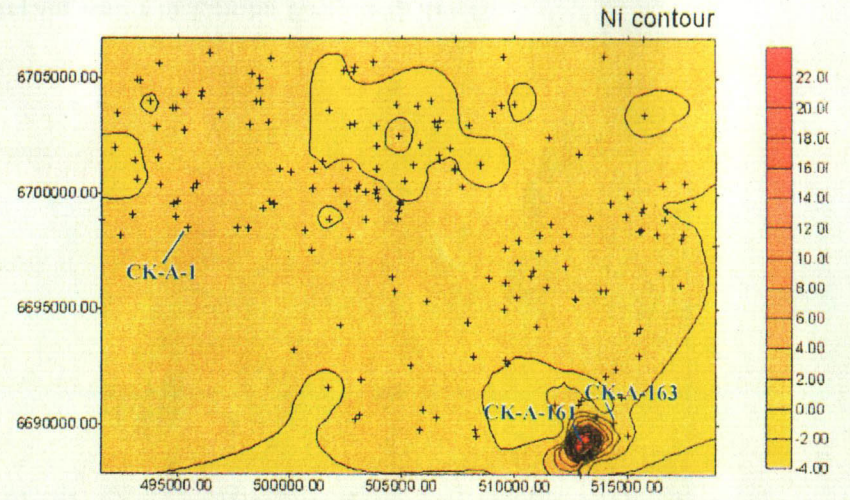
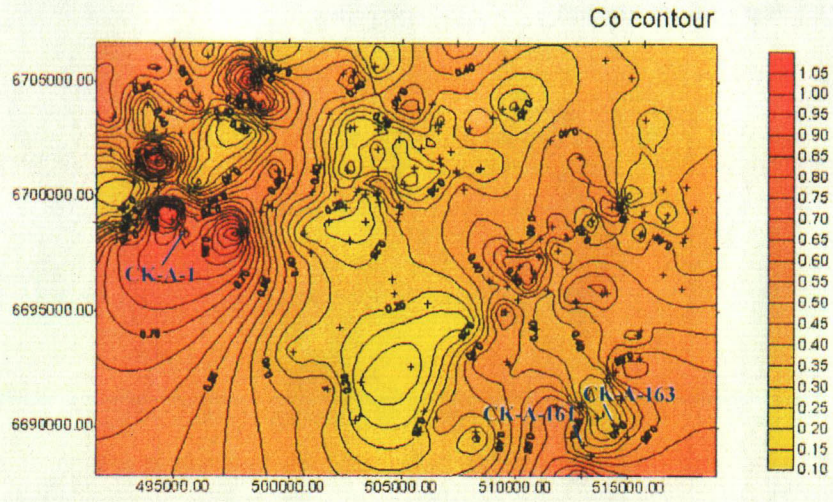


Fig. II-3-7-4 Contour map of Co, Ni, Cu and Zn for stream water in Lomba Grande district

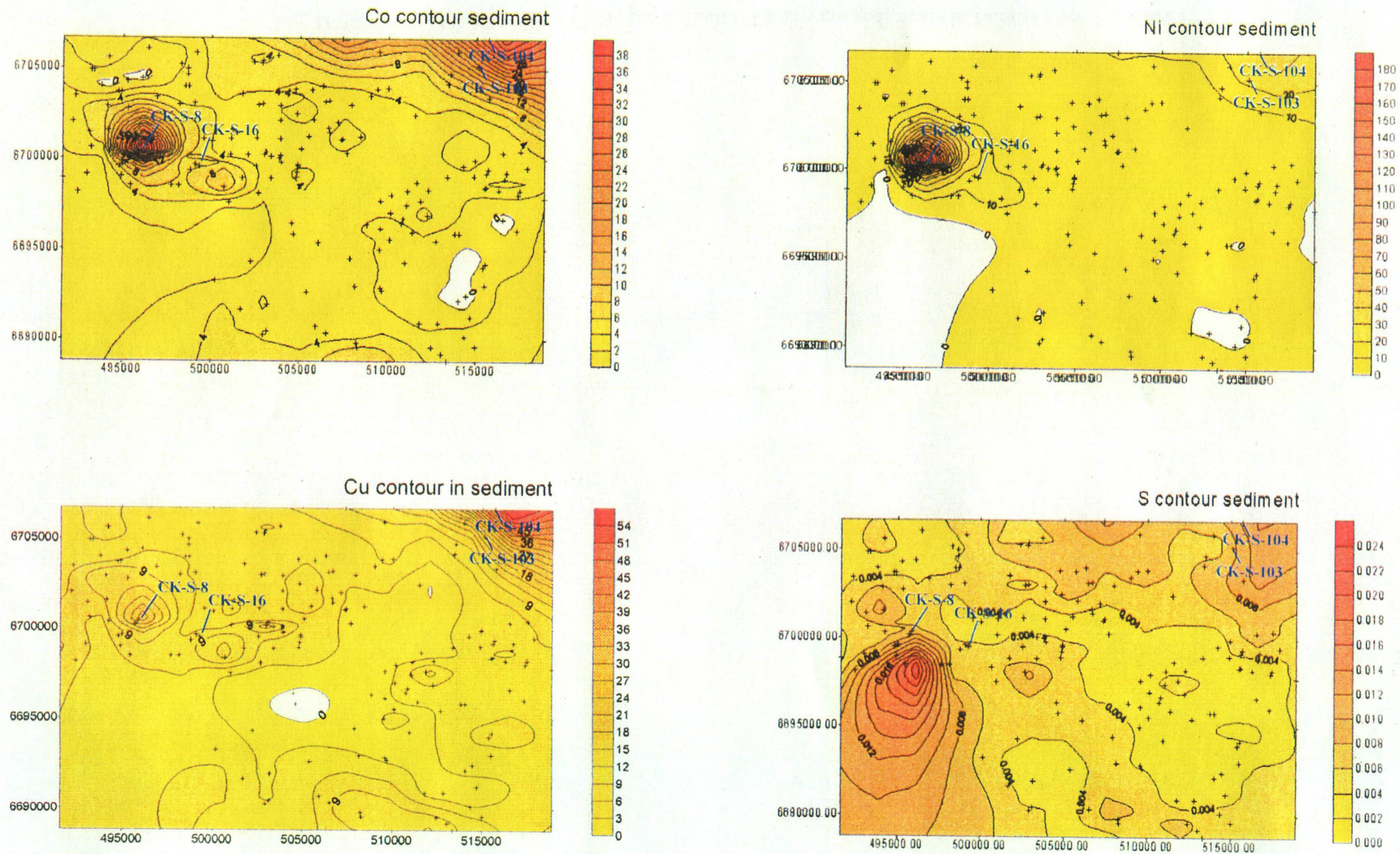


Fig. II-3-7-5 Contour map of Co, Ni, Cu and S for stream sediments in Lomba Grande district

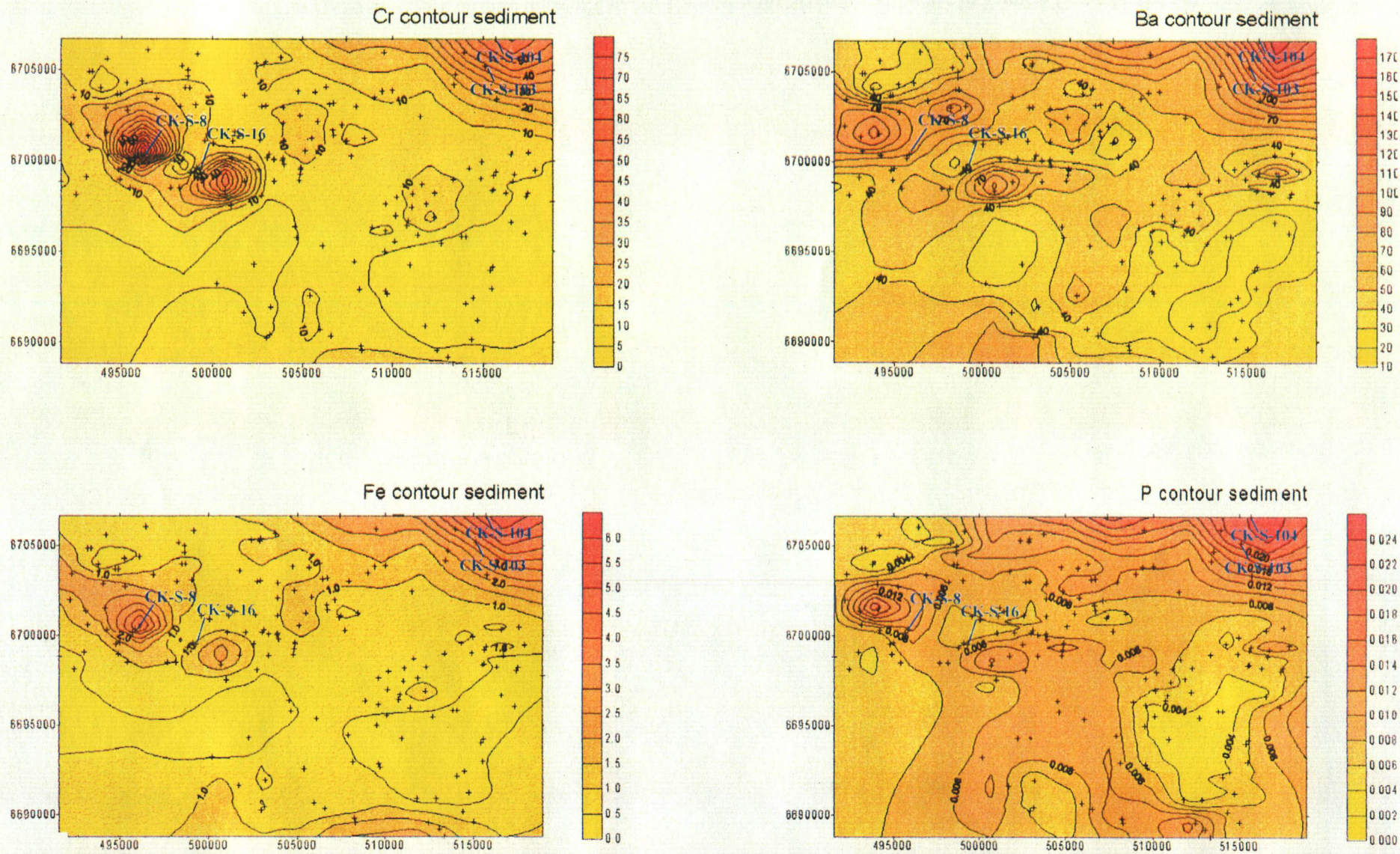


Fig. II-3-7-6 Contour map of Cr, Ba, Fe and P for stream sediments in Lomba Grande district

Other two samples, collected at Santa Cruz do Pinhal of the northeastern part in the geochemical survey area, also indicated high values of analysis; the analytical values of CK-A-103 indicated Cu: 22 ppm, Co: 26 ppm, Ni: 34 ppm, Ba: 154 ppm and Cr: 50 ppm, and the analytical values of CK-A-104 indicated Cu: 66 ppm, Ni: 36 ppm, Co: 40 ppm, Ba: 183 ppm, and Cr: 50 ppm. They may indicate an existence of unknown intrusive rocks that were not recognized by drillings.

As the results of geochemical survey, the geochemical anomaly of the stream sediments and water is recognized in the two areas which basic sills distribute under the surface. One is in the northwestern part of survey area, another is in southeastern part of survey area.

One of these intrusive rocks is the Lomba Grande sill, however the geochemical anomaly indicates about two times larger than the volume of the Lomba Grande intrusion recognized on the surface.

3-7-4 Summary of the Survey

We tried conducting geochemical survey in the southern part of the Lomba Grande area. The results is the following:

- The geochemical survey using the stream sediments and water is an effective methods means to extract geochemical anomaly.
- An overlap of distribution between of the geochemical anomaly of Co, Ni, Cu, Cr and S in the stream sediments and the geochemical anomaly of Co and SO₄ in the stream water. This may indicate an existence of intrusions including sulfides.
- The geochemical anomaly of Cu, Ni and As extracted at the southeastern part in the survey area, is covered with the Quaternary sediments (coastal plain). This may indicate that basic rock bodies exist under the Quaternary sediments.
- With data bank of appropriate analytical results of drilling core and rock samples, the target areas may be extract by following geochemical survey of rock samples and detailed mineralogical identifications.