

The deposits of the Kryvyi Rih/Krivoy Rog region within the Ukrainian Shield and the [Kursk Magnetic Anomaly](#) on the Voronezh plate in SW Russia form a single gigantic metallogenic province of possibly correlative sequences. The iron-formation succession at Kryvyi Rih/Krivoy Rog consists of seven members having a total thickness of ~1300 m, whereas that of the Kursk area comprise five members having a thickness of ~500 m (Alexandrov, 1973).

It lies within the valley of the Ingulets River and its tributaries, the Saksagan and the Zheltaya, and extends in a NNE direction over an interval of about 100 km. The basin is developed within the crystalline basement of the Kurainian massif, comprising Archaean gneisses, granites, migmatites, amphibolites and schists exposed to the west and east of the 2200-2000 Ma Palaeoproterozoic Krivbass geosyncline. The Proterozoic Krivoi Rog Series within the Krivbass is divided into three sections:

- i). a lower arkose-quartzite and phyllitic sequence, with a horizon of talc schists,
- ii). a middle, ore-bearing ferruginous quartzite (banded iron formation - BIF) and slate sequence, which includes includes nine BIF horizons intercalated with quartz-sericite, chlorite-sericite, slates and microquartzites; and
- iii). an upper, quartzite-sandstone-slate sequence with lenses of marble.

The Krivoi Rog Series is folded into a complex synclinal structure of synclinal and anticlinal folds with dips on the limbs of 45 to 80°, for the most part with a keel shaped synclinal closure plunging at up to 40° northwards. The limbs of the major synform has been intruded by Proterozoic granite and are cut by longitudinal faults or overthrusts, resulting in the ore-bearing units being segregated along the north-south strike of the basin to form the: i). southern-most **Inguletsky**, ii). the **Saksagan** or Main, iii). the **Pervomaïsk**, iv). **Annovsk**, and v). the northern **Zheltorechensk** and **Popel'nostovsk** ore fields. The largest reserves of high grade ores are concentrated in the Saksagan ore field where the ore-bearing middle unit attains a thickness of up to 2000 m and contains up to eight BIF seams.

The BIFs (locally termed 'ferruginous quartzites') comprise magnetite, magnetite-hematite, and hematite varieties, the most economically significant being the unoxidized magnetite and magnetite-hematite varieties. The high grade ores consist mainly of iron oxides and hydroxides which form column-like, less commonly stock-, and lens-like, and more rarely layer-like segregations and bodies within the BIF units, the characteristics of which vary from location to location within the basin. This high grade ore was formed by the leaching of quartz and oxidation of iron silicates within the BIFs.

The high grade segregations are commonly localised on the limbs of the major folds where those limbs are deformed by tranverse cross-folds and 'crumpling', accompanied by the development of cleavage and interstratal movements, strike-slip faulting, fracture intersections and in zones of fracturing, crushing and jointing. They form chains with larger or smaller accumulations, with the individual ore bodies apparently merging at depth in the keel of the syncline to form large ore columns coinciding with the fold keels.

The richest concentrations of ore in the main **Saksagan** ore field are associated with the fifth and sixth BIF units, which contain higher grade primary mineralisation, and have thinner bedding which contributed to the development of the deformation. The ore segregations are located totally within the BIF units, on the limbs and within the keels of the synclines. In the **Southern** ore fields, concordant planar ore layers are localised in the unconformable contact between the middle and upper sections of the Krivoi Rog Series. In the **Northern** ore fields, the ores have been hydrothermally-metasomatically altered.

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