

# GEOLOGICAL CHARACTERISTICS OF THE ISONZO PLAIN

The Isonzo-Soca Plain represents the easternmost edge of the Friuli Plain and has similar genetic and hydrogeological characteristics. It is constituted almost entirely by quaternary alluvial deposits of Torre, Judrio, Versa and Isonzo rivers. These rivers have deposited coarse sediments in correspondence to their junction with the plain, and finer sediments as they arrive downstream, bringing to the development of two distinct areas in terms of granulometry and permeability of the deposits:

High Plain (upstream of the Fascia delle Risorgive), which is limited to the North by Collio hills and to the South by the Karst plateau, and is constituted mainly by coarse and very permeable sediments;

Low Plain (downstream of ...), which is limited to the East by the Karst plateau and to the South by the sea, and is constituted mainly by clayey or sandy-clayey sediments with low or null permeability.

High and Low Plain are separated by the Resurgence Belt which has a NW-SE orientation. Due to the decrease in permeability towards South, the High Plain phreatic waters raise up and outcrop in correspondence to the Resurgence Belt. The outcrop of these waters is here favoured also by the occurrence of impermeable clayey layers, which upstream held up the phreatic waters (Cucchi et al, 1999; Fontana, 2006).

All the mountain rivers dissipate a great amount of water during their way in the High Plain and suffer losses of water from the river-bed and the sides. This is the reason why rivers such as Torre and Judrio remain dry almost for the whole year. These seepage waters, together with rain and run-off waters coming from the hills and karst waters coming from the underground, constitute the phreatic aquifer of the High Plain.

In the Low Plain a complex multi-aquifer system develops because of the entrance of wide clayey lenses from the South into the High Plain. It is composed by a sequence of overlapping confined and semi-confined aquifers (Vatta, 1992; Stefanini&Cucchi, 1976; Cucchi et al., 2002).

Upstream of the Resurgence Belt, very deep artesian or pseudo-artesian aquifers occur (at San Pier d'Isonzo, 200 m from the ground level); they are fed by the near Isonzo Karst massif.

This condition occurs in the extraction areas of the Gorizia aqueduct, where pressured waters are locally present because of the occurrence of conglomerates intercalated in the alluvial sediments, and also in the Trieste aqueduct, where the San Pier d'Isonzo wells extract waters from deep aquifers confined between clayey horizons (Cucchi et al., 1999).

From a lithological viewpoint, the northern hills are constituted by marlstones and siltstones belonging to the Flysch formation, whereas the eastern reliefs by the intensely karstified limestones of the Karst plateau. The alluvial cover lays on limestones or on silicic-clastic turbidites. In the apical part its thickness reaches

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50-80 m.. The greatest thicknesses 200-300 m) are registered along the Mariano del Friuli-Soleschiano alignment, where the gravel deposits arrive at the bedrock. The bedrock deepens increasingly and regularly from North to South and towards the coast it occurs at a depth of 250 m (Nicolich et al., 2004). Geophysical investigations allowed to recognize a deep incision of the bedrock (300-400 m below the ground level), which is located in correspondence to the buried eastern edge of the karst plateau. It is like a fluvial gorge in the section between the Isonzo Karst and the Medea relief (Cucchi et al., 2002; Berlasso&Cucchi, 1991).The carbonate bedrock outcrops in correspondence to the Medea relief and Gradisca, whereas at the Gorizia Castle and Farrad'Isonzo the bedrock is constituted by Flysch(Vatta, 1992; Stefanini&Cucchi, 1976; Cucchi et al., 2002).

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