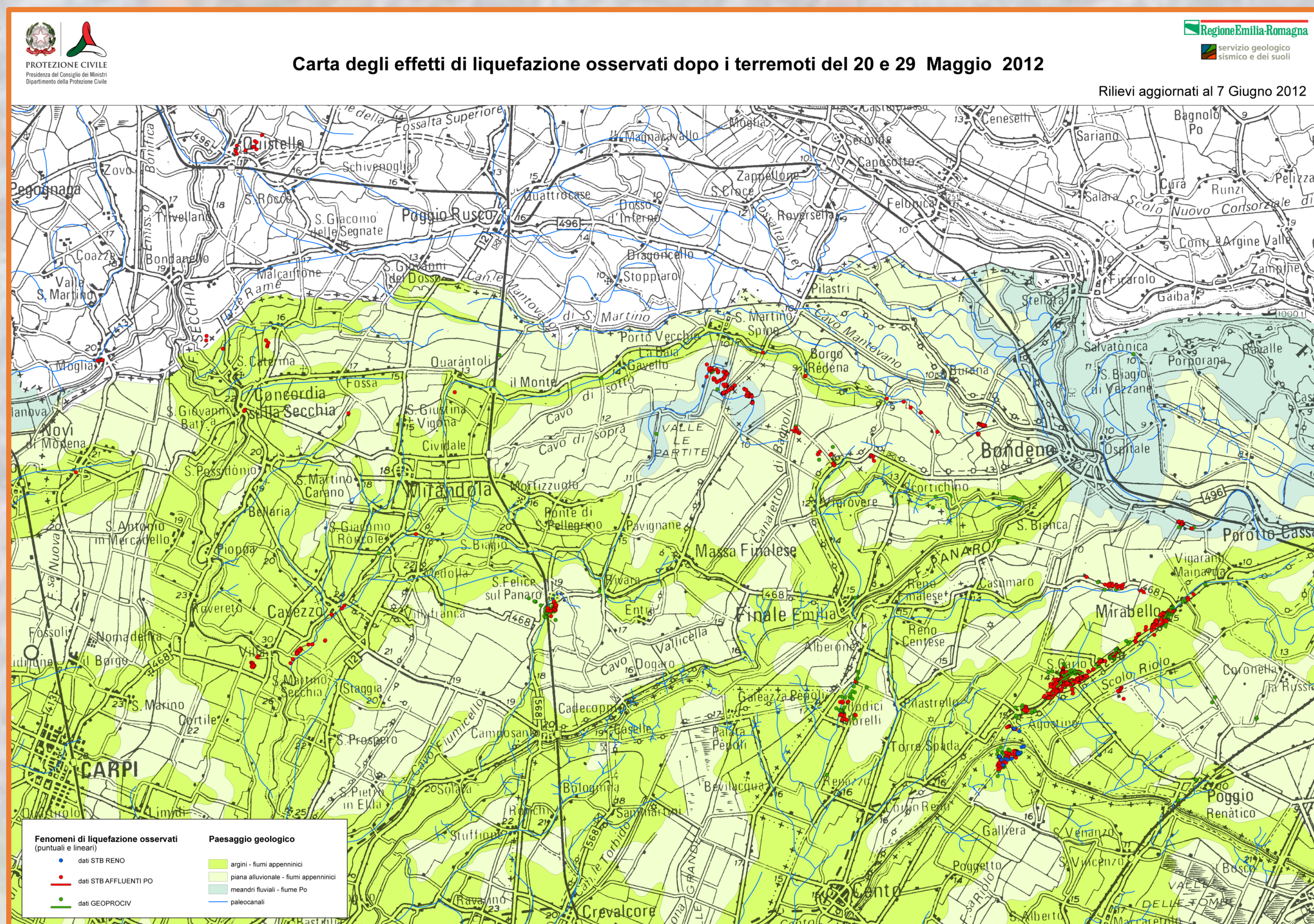


Po Plain

Earthquake liquefaction studies and subsurface geology



During and after the Emilia seismic sequence (May 2012) soil liquefaction effects have been observed and mapped. The phenomena were located in correspondence of levee or channel sand.

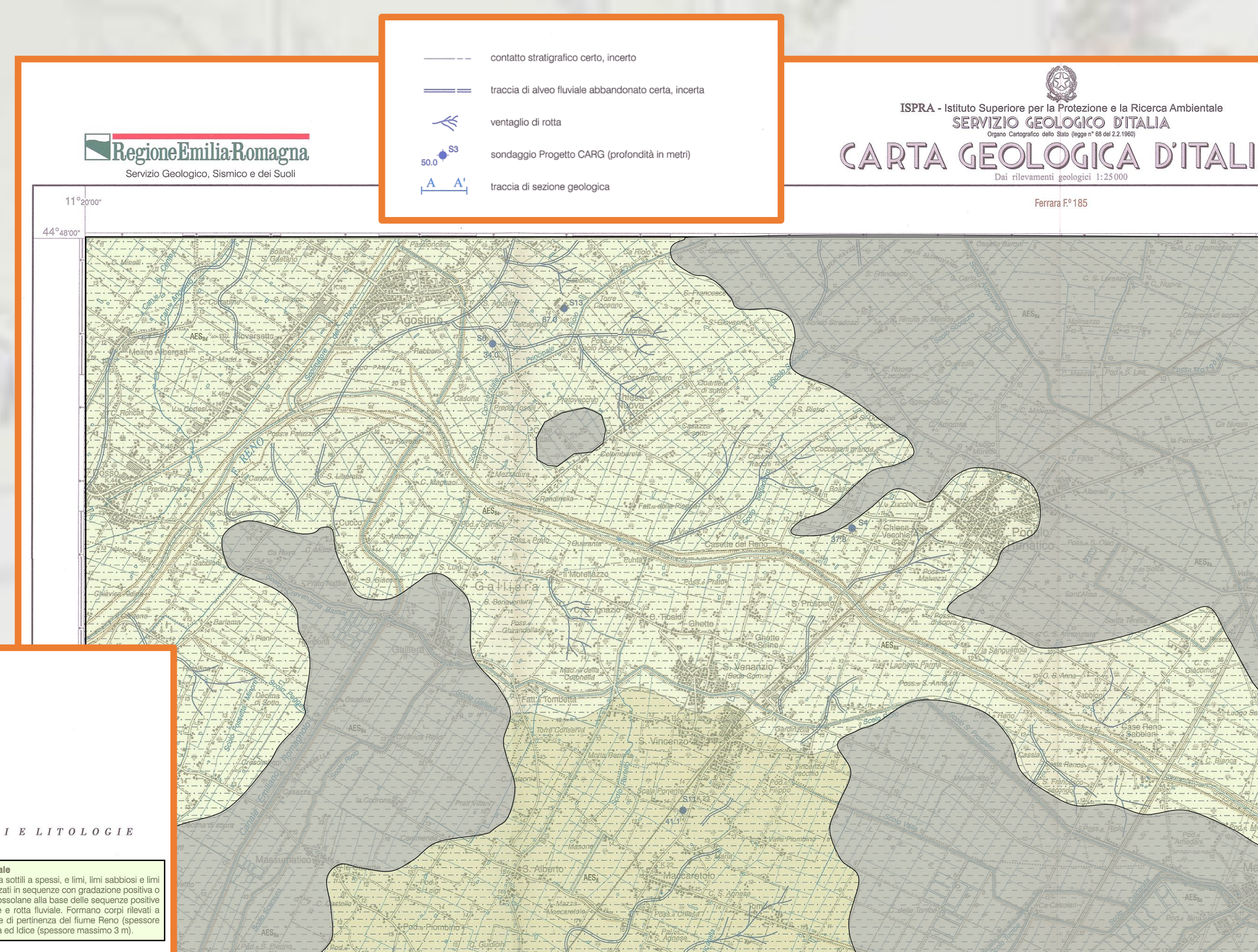
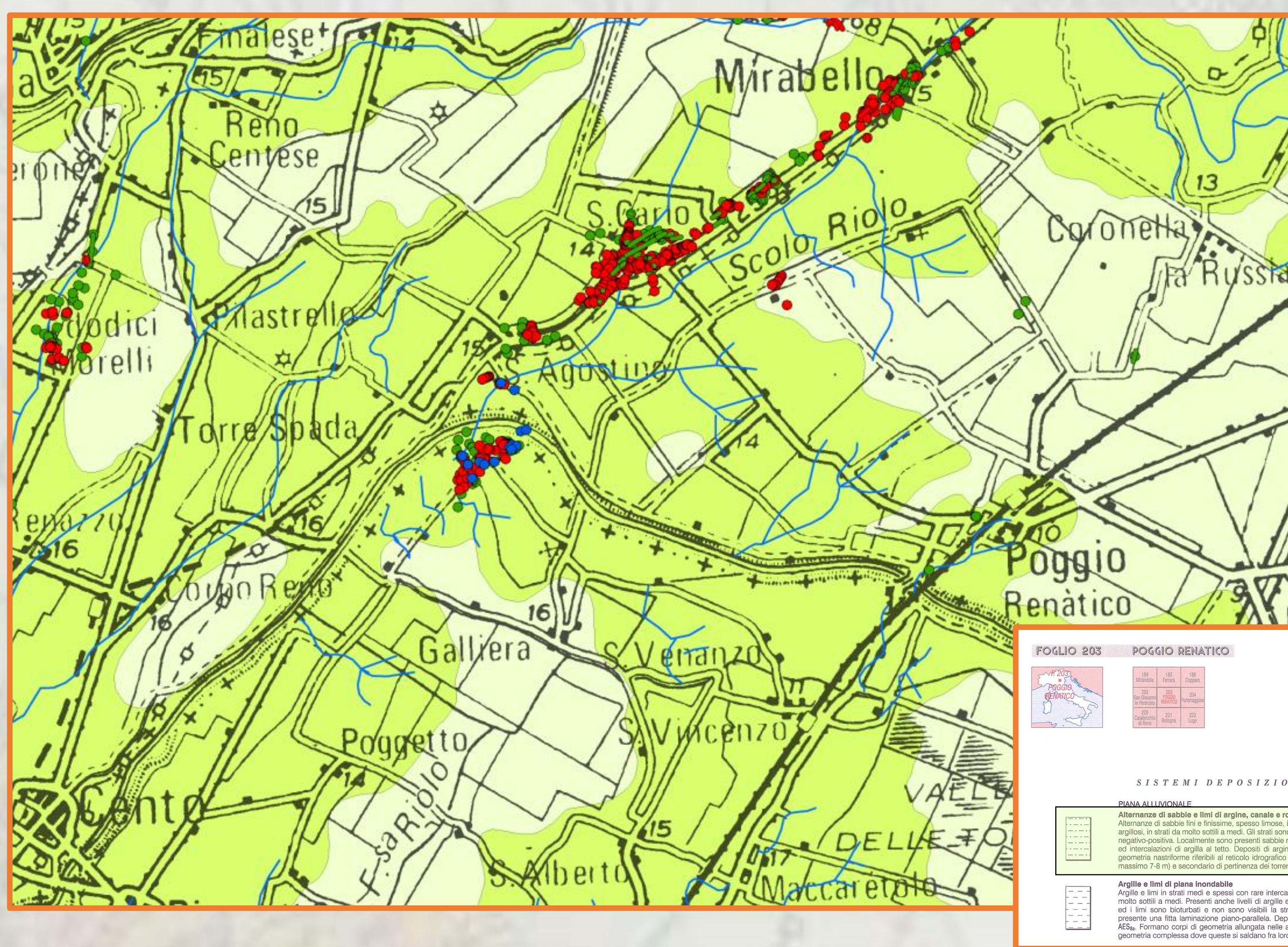


Soil liquefaction is a phenomenon whereby a saturated or partially saturated soil loses strength and stiffness in response to an applied stress, usually earthquake shaking or other sudden change in stress condition, causing it to behave like a liquid (similar to quicksand).

The liquefaction occurs if the following conditions happen together:

- loose sand (relative density $D_r < 60\%$) at depth $< 15-20$ m, with an average particle size: $0.02 \text{ mm} < D_{50} < 2 \text{ mm}$, and fine grain ($< 0.05 \text{ mm}$) content $< 15\%$;
- depth of the water table < 15 m;
- earthquake $M > 5.5$, $PGA > 0.15 \text{ g}$, shaking time $> 15-20$ s.

The Geological Map at 1:50,000 scale (Sheet 203 “Poggio Renatico, 2009) includes the mapping of levee sand that may be prone to liquefaction, thus representing a basic input data for further analyses and applications.



The next generation of geological maps are the 3D geological models that enables a comprehensive and integrated representation of both surface and subsurface geology, from shallow to deep. A wide area, including the zone of 2012 earthquake, has been already modeled in great detail, thereby providing an unprecedented 3D imagery of the geology beneath our feet.

