

Gypsum karst in Italy: a review

Jo De Waele (1), Veronica Chiarini (1,2), Andrea Columbu (3), Ilenia M. D'Angeli (1), Giuliana Madonia (4), Mario Parise (5), Leonardo Piccini (6), Marco Vattano (4), Bartolomeo Vigna (7), Luca Zini (8), and Paolo Forti (1)

(1) University of Bologna Alma Mater, Scienze della Terra e Geologico Ambientali, Bologna, Italy (jo.dewaele@unibo.it), (2) Laboratoire EDYTEM, UMR CNRS 5204, Université Savoie Mont Blanc, Pôle Montagne, 73376 Le Bourget du Lac cedex, France, (3) School of Geography, University of Melbourne, VIC 3010, Australia, (4) Department of Earth and Marine Sciences, Via Archirafi 22, 90123 Palermo, Italy, (5) National Research Council, IRPI, Via Amendola 122-I, 70126 Bari, Italy, (6) Department of Earth Sciences, Via La Pira 4, 50121 Firenze, Italy, (7) Department of Territorial Engineering, of the Environment and of Geotechnologies, Politecnical University of Turin, Corso Duca degli Abruzzi 24, 10129 Torino, Italy, (8) Department of Geosciences, Via Weiss 2, 34127 Trieste, Italy

Although outcropping only rarely in Italy, gypsum karst has been described in detail since the early XXth century (Marinelli, 1917). Gypsum caves are now known from almost all Italian regions (Madonia & Forti, 2003), but are mainly localised along the northern border of the Apennine chain (Emilia Romagna and Marche regions), Calabria, and Sicily, where the major outcrops occur. Recently, important caves have also been discovered in the underground gypsum quarries in Piedmont (Vigna et al., 2010).

During the late 80s and 90s several multidisciplinary studies have been carried out in many gypsum areas. All this work converged into a comprehensive overview in 2003 (Madonia & Forti, 2003).

Further detailed studies focused on the gypsum areas of Emilia Romagna (Chiesi et al., 2010; Forti & Lucci, 2010; Demaria et al., 2012; De Waele & Pasini, 2013; Ercolani et al., 2013; Columbu et al., 2015; Lucci & Piastra, 2015; Tedeschi et al., 2015) and of Sicily (Madonia & Vattano, 2011). Sinkholes related to Permo-Triassic gypsum have been studied in Friuli Venezia Giulia (Zini et al., 2015).

This presentation will review the state of the art regarding different aspects of evaporite karst in Italy focusing on the main new results.

References

- Chiesi M., et al. (2010) – Origin and evolution of a salty gypsum/anhydrite karst spring: the case of Poiano (Northern Apennines, Italy). *Hydrogeology Journal*, 18, pp. 1111-1124.
- Columbu A. et al. (2015) - Gypsum caves as indicators of climate-driven river incision and aggradation in a rapidly uplifting region. *Geology*, 43(6), 539-542.
- Demaria D. et al. (Eds.) (2012), *Le Grotte Bolognesi*, GSB-USB, 431 p.
- De Waele J., Pasini G. (2013) - Intra-messinian gypsum palaeokarst in the northern Apennines and its palaeogeographic implications. *Terra Nova* 25, pp. 199-205.
- Ercolani M., et al. (Eds.) (2013), *I Gessi e la Cave i Monte Tondo. Studio multidisciplinare di un'area carsica nella Vena del Gesso Romagnola*. Memorie Ist. It. Spel. II(26), 559 p.
- Forti P., Lucci P. (Eds.) (2010) – Il Progetto Stella-Basino. Studio multidisciplinare di un sistema carsico nella Vena del Gesso Romagnola. Memorie Ist. It. Spel. II(14), 260 p.
- Lucci P., Piastra S. (Eds.) (2015), *I Gessi di Brisighella e Rontana: studio multidisciplinare di un'area carsica nella Vena del Gesso Romagnola*. Memorie Ist. It. Spel. II(28), 751 p.
- Madonia G., Forti P. (2003) – Le aree carsiche gessose d'Italia. *Memorie Ist. It. Spel. II(14)*, 285 p.
- Madonia G., Vattano M. (2011) - New knowledge on the Monte Conca gypsum karst system (central-western Sicily, Italy). *Acta Carsologica*, 40, (1), pp. 53–64.
- Marinelli O. (1917) – Fenomeni carsici nelle regioni gessose d'Italia. *Mem. Geografiche di Giotto Dainelli*, 34, pp. 263-416, suppl. to *Riv. Geografica It*
- Tedeschi L. et al. (2015) - Comportamento idrogeologico di alcune risorgenti carsiche nei gessi dell'Emilia-Romagna. *Memorie Ist. It. Spel. II(29)*, pp. 399-404.
- Vigna B. et al. (2010) - Evolution of karst in Messinian gypsum (Monferrato, Northern Italy). *Geodinamica Acta*, 23(1-3), pp. 29-40.
- Zini L. et al. (2015) - a multidisciplinary approach in sinkhole analysis: the Quinis village case study (NE-Italy). *Engineering Geology*, 197, pp.132-144.