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VENICE SHALL RISE AGAIN

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Groundwater withdrawal over the 1950s - 1960s has significantly contributed to the loss of elevation of the historical centre of Venice relative to the Adriatic Sea. The frequency of the city flooding during high tides (the so-called "acqua alta" in the Venetian idiom) has drastically increased over the last century. For example, St. Mark's square, which today is statistically flooded on the average 50 times per year for tides higher than 80 cm above datum, was submerged less than 10 times 100 years ago. Based on a number of evidences of land upheaval due to fluid injection into the subsurface and a large dataset of hydrological, geological, and geomechanical information of the sedimentary basin underlying the Venice coastland, an innovative engineering approach has been recently developed to raise Venice by seawater injection into the saline aquifers located at 650–1000 m depth. The use of advanced numerical models allows for a prediction of a quite uniform 25–30 cm uplift of the city over 10 years after the inception of injection. On consideration of the global climate change expected to occur over the next few decades and the natural land settlement affecting the city, a Venice heave of 25–30 cm might offset the ~25 cm relative sea level rise of the northern Adriatic Sea as predicted at the end of the present century. The various aspects of this project along with a summary of the history of Venice and the actions undertaken by the Venetian Republic to preserve the lagoon environment and protect the city from the sea and the land attacks are addressed in the CD-ROM booklet "VENICE SHALL RISE AGAIN - Engineered uplift of Venice through seawater injection", published in 2013 by the authors. The book describes the millennial battle of the Serenissima against the waters. May now water be the right solution to save this beloved city in the years to come?

Session No. 202
T49. Groundwater Extremes: Groundwater's Role in Drought, Floods, Depletion, Subsidence, Landslides, and Sea-Level Rise
Tuesday, 29 October 2013: 8:00 AM-12:00 PM

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