HR: 1410h
AN: **NH43C-03**
TI: Risk of land degradation due to saltwater intrusion along the Venice coastland, Italy *(Invited)*
AU: ***Teatini, P**
EM: *teatini@dmsa.unipd.it*
AF: *Dept. of Civil, Environmental and Architectural Engineering, University of Padova, Padova, Italy*
AU: **Manoli, G**
EM: *manoli@dmsa.unipd.it*
AF: *Dept. of Civil, Environmental and Architectural Engineering, University of Padova, Padova, Italy*
AU: **Scudiero, E**
EM: *elia.scudiero@studenti@unipd.it*
AF: *Dept. of Agronomy, Food, Natural Resources, Animals and the Environment, University of Padova, Padova, Italy*
AU: **Deiana, R**
EM: *rita.deiana@unipd.it*
AF: *Dept. of Geosciences, University of Padova, Padova, Italy*
AU: **Perri, M**
EM: *mariateresa.perri@unipd.it*
AF: *Dept. of Geosciences, University of Padova, Padova, Italy*
AU: **Braga, F**
EM: *federica.braga@ismar.cnr.it*
AF: *Institute of Marine Sciences, National Research Concil, Venice, Italy*
AU: **Tosi, L**
EM: *luigi.tosi@ismar.cnr.it*
AF: *Institute of Marine Sciences, National Research Concil, Venice, Italy*
AU: **Putti, M**
EM: *putti@dmsa.unipd.it*
AF: *Dept. of Mathematics, University of Padova, Padova, Italy*
AU: **Morari, F**
EM: *francesco.morari@unipd.it*
AF: *Dept. of Agronomy, Food, Natural Resources, Animals and the Environment, University of Padova, Padova, Italy*
AB: The southern portion of the Venice coastland includes a very precarious environment. Due to an elevation down to 4 m below msl, the Venice Lagoon and Adriatic Sea proximity, and the encroachment of seawater from the mouth of the river network up to 20 km inland, salt contamination of land and groundwater is a severe problem that is seriously impacting the farmland productivity. An interdisciplinary multi-scale research is ongoing with the aim of understanding the contamination process, quantifying the effect of the saltwater intrusion of the crop production, and proposing possible mitigation strategies. A 25 ha basin cultivated with maize crop and representative of the area has been deeply monitored at various scales ranging from a few square meter plots up to the whole basin. Geophysical surveys, lab testing on soil and water samples, continuous measurements of hydrological parameters, physiological crop parameters, proximal sensing and multi-spectral remote sensing acquisitions, together with precise crop yield distribution were performed and acquired from 2010 to 2012. Geomorphological investigations, seismic and geo-electrical surveys combined with salt concentration measurements in the surficial waterbodies and groundwater (down to 10 m deep) are used to delineate the major pathways of seawater intrusion. Relationships existing between soil, water, crop factors and crop yield were identified, helping to assess plant stress at both the canopy and landscape level. The dataset is now used to set-up a three-dimensional numerical model of saturated/unsaturated water dynamics coupled with a crop-growth model. The model is applied at the basin scale to investigate the effects of water stress and soil contamination on the crop

production. Once calibrated on hydrological records (e.g., groundwater levels, capillary pressure, etc.), crop growth, and yield production, the model will be applied to investigate expected scenarios related with the change of natural environmental conditions, e.g., sea level rise and heat waves due to global climate changes, and the implementation of mitigation strategies, e.g., the closure of the river mouth by mobile gates.

DE: [0402] BIOGEOSCIENCES / Agricultural systems
DE: [1809] HYDROLOGY / Desertification
DE: [1855] HYDROLOGY / Remote sensing
DE: [4303] NATURAL HAZARDS / Hydrological
SC: Natural Hazards (NH)
MN: 2012 Fall Meeting