
КОРОТКІ ПОВІДОМЛЕННЯ: ПРОТИЕРОЗІЙНА СТІЙКІСТЬ ТА УПРАВЛІННЯ ЛАНДШАФТАМИ

UDK 631.4

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CHANGES IN THE RECENT PEDOGENESIS. ROLE OF THE HYDROMORPHISM IN TWO SMALL-LAKES OF THE DOÑANA NATIONAL PARK (HUELVA, SW SPAIN)

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In the coastal wetlands complex of *Littoral Aeolian Sand Sheet of El Abalario-Doñana* are recognized diverse pedological sequences during the Holocene. The aim of this paper is to show two of these sequences, which present a residual and relict characters nowadays, and the role that the seasonal *hydromorphism* plays in the old and past pedogenesis. The study is focused in two ponds of the mentioned wetland complex (called "lagunas", ephemeral and temporally small-lakes: laguna Navazo del Toro (NVT) and laguna Charco del Toro (CHT) (Doñana National Park).

Key words: changes, pedogenesis, hydromorphism.

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ЗМІНА ПРОЦЕСІВ ҐРУНТОУТВОРЕННЯ, ЯКІ ВІДНОСЯТЬСЯ ДО СУЧАСНОЇ ГЕОЛОГІЧНОЇ ЕПОХИ. РОЛЬ ГІДРОМОРФІЗМУ НА ПРИКЛАДІ ДВОХ ОЗЕР У НАЦІОНАЛЬНОМУ ПАРКУ DOÑANA (ПІВНІЧНО-ЗАХІД ІСПАНІЇ)

Для берегового заболоченого комплексу *El Abalario-Doñana* (голоцен) характерними є декілька різних типів ґрунтоутворення. У даній статті мова йде про два з них, кожний із яких на сьогодні є реліктовим, а також про роль сезонного гідроморфізму в давньому ґрунтоутворенні. Об'єктами дослідження стали дві водойми комплексу, назва якого наводиться вище («одноденні» маленькі озера: лагуна Navazo del Toro (NVT) та лагуна Charco del Toro (CHT) (Національний парк Доñana).

Ключові слова: зміни, ґрунтоутворення, гідроморфізм.

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ИЗМЕНЕНИЕ ПРОЦЕССОВ ПОЧВООБРАЗОВАНИЯ, ОТНОСЯЩИХСЯ К СОВРЕМЕННОЙ ГЕОЛОГИЧЕСКОЙ ЭПОХЕ. РОЛЬ ГИДРОМОРФИЗМА НА ПРИМЕРЕ ДВУХ ОЗЕР В НАЦИОНАЛЬНОМ ПАРКЕ DOÑANA (СЕВЕРО-ЗАПАД ИСПАНИИ)

Для берегового заболоченного комплекса *El Abalario-Doñana* (голоцен) характерны несколько различных типов почвообразования. В данной статье речь пойдет о двух из них, каждый из которых на сегодняшний день является реликтовым, а также о роли сезонного гидро-

морфизма в древнем почвообразовании. Объектами исследования стали два водоема упомянутого выше комплекса («однодневные» маленькие озера: лагуна Navazo del Toro (NVT) и лагуна Charco del Toro (CHT) (Национальный парк Доñana).

Ключевые слова: изменения, почвообразование, гидроморфизм.

In the coastal wetlands complex of *Littoral Aeolian Sand Sheet of El Abalarío-Doñana* are recognized diverse pedological sequences during the Holocene. The aim of this paper is to show two of these sequences, which present a residual and relict characters nowadays, and the role that the seasonal *hydromorphism* plays in the old and past pedogenesis. The study is focused in two ponds of the mentioned wetland complex (called «lagunas», ephemeral and temporally small-lakes: laguna Navazo del Toro (NVT) and laguna Charco del Toro (CHT) (Doñana National Park) (fig. 1).

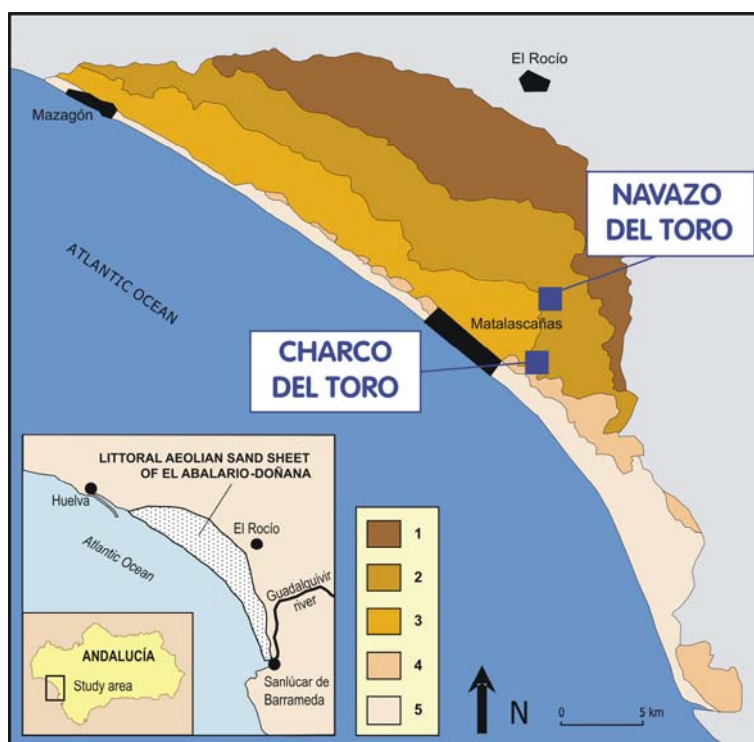


Fig. 1. Geographical and geomorphological setting of the study area (small-lakes «ponds» studied in deep blue square), in the context of the aeolian sand littoral sheet of El Abalarío-Doñana (SW Spain) zone. Five morphosedimentary units were recognized:

- stabilized aeolian deposits in down position with ancient vegetation (1),
- stabilized aeolian deposits in upper position with ancient vegetation and humid character (2),
- stabilized aeolian deposits in upper position with ancient vegetation and dry character (3),
- semiactive dunes (4), and active dunes (5)

The studied area is located between Mazagón area (Huelva province) and the mouth of the Guadalquivir river, opposite to Sanlúcar de Barrameda (Cádiz) village, forming a morphosedimentary complex system in which five geomorphological aeolian units are recognized, all of them composed principally by quartz sands (> 80 %) (Fig.1), whose chronology include from the end of Late Pleistocene to the present. Associated to this aeolian system is recognized a great wetland complex that has been inventoried, identifying 639 ponds. Most of them show a marked seasonal functioning (the Santa Olalla complex appears only like permanent wetland), that reflect faithfully the great variability as much as

annually and interannually of the rainfall regime in SW Spain. The annual rainfall average is 540 mm year¹, falling most of it from november-february months and in spring period (april-may) too; the annual average temperature is around 17 °C. The climatic conditions of this area are of a Mediterranean-Atlantic characteristics. The dominant vegetation of the wetlands is represented by hydrophytic forest and an external border in which species of the mediterranean shrubs are predominant.

We have studied different soils catenas in two small-lakes of Doñana National Park, NVT and CHT. These two catenas show a double and different pedogenetical evolution. At the present, pedogenetical hydromorphic processes are dominant in both. In NVT, the environment wetland conditions are partially drainage and it has got neutral or lightly pH acid values (between 6 and 7). The profile NVT 4 presents a thickness at the top of 0,50 m with two differentiated horizons: the high level has more than 57 % of clay and the lower, more than 17 %, in both of smectites, leading to a palaeovertisol formation (fig. 2a). In the profiles CHT I and II an pedological sequence is identified like a very acid confined environment (pH 5–6), that contributes to an organic horizon very marked (around 35 % O.M. ignition), which is followed by several horizons, for instance, enriched in organic matter, E horizons and others enriched in amorphous minerals of iron oxides (fig. 2b and 2c). These conditions identify the podzolization processes derived from strong soil acidity.

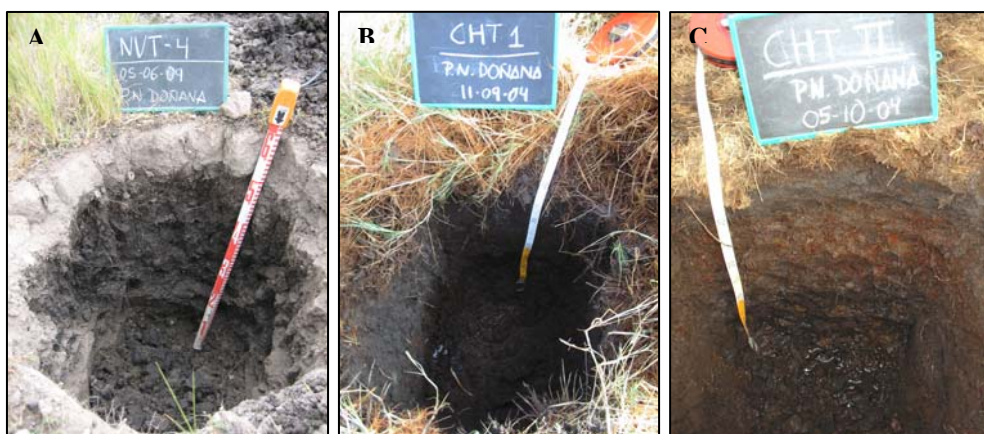


Fig. 2. Main features of soil profiles studied:

- A) NVT 4: dark clay horizon (smectites); B) CHT I: organic matter horizon with small Fe contents; and C) CHT II: sandy-silt oxic horizon cemented by O.M. and iron oxides

At present, the pedological conditions mentioned are in ecological unbalanced condition forms in two ponds. In NVT, the profile is located in a high basin (upper part of the catena) whereas the profiles CHT are in the low basin. In both cases the current hydromorphic processes degrade as much the vertic properties of the horizons (NVT) and the previous podzolic horizons (CHT). In the first case, the degradation is influenced by a seasonal subsurface flows, whereas in the second one is due of the groundwater level (*hypogenic* flows) annual fluctuation.

Acknowledgements

This research has been supported by the Projects OAPN 036/2008 and CGL2008-04000, and represented a contribution to the IGCP495 research too.

Надійшла до редколегії 20.10.09