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CORRELATIONS OF THE AUSTRIAN SOIL CLASSIFICATION 2000 WITH THE WRB 2006

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In general exists a good parallelization between the RSG of the WRB 2007 with the Austrian Soil Classification 2000 especially due the new RSG Technosols and Stagnosols. The age of Cambisols and alpine soils must be discussed as well a new RSG Colluvisols.

Keywords: Anthrosols, Technosols, Stagnosols, Cambisols, colluvic soils, alpine soils, WRB 2006, Austrian Soil Classification 2000.

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КОРЕЛЯЦІЯ АВСТРІЙСЬКОЇ КЛАСИФІКАЦІЇ ҐРУНТІВ 2000 З WRB 2006

Виявлено добру паралельність між РГГ *WRB* 2006 з австрійською Класифікацією ґрунтів 2000, особливо для нових реферативних груп *Technosols* і *Stagnosols*. Існує потреба в обговоренні віку *Cambisols* і альпійських ґрунтів, а також нової РІПГ *Colluvisols*.

Ключові слова: Anthrosols, Technosols, Stagnosols, Cambisols, колювіальні ґрунти, альпійські ґрунти, WRB 2006, австрійська Класифікація ґрунтів 2000.

In pedological communications at national and international level the soil type occupies an important, if not the most important, position. The soil type is the crystallization point of all pedological work.

For international understanding and coordination too, we have a very valuable instrument at our disposal in the World Reference Base for Soil Resources 2006 (WRB 2006). This does not relieve us of the duty of undertaking, initially at a national level, a typological classification, because the WRB is not meant to substitute for nationals soil classification systems but rather to serve as a common denominator for communication at the international level. The WRB exercises a function similar to an «umbrella».

A further preliminary remark should be made.

We have to compare two differently conceived systems. The WRB 2006 is predominantly conceived according to characteristic features such as diagnostic horizons, diagnostic properties and diagnostic materials while the Austrian Soil Classification 2000 (ÖBS 2000) forms the basis of a morphologic-genetic system. Therefore, complete congruence is not something to be expected, but a parallelization can only be undertaken in stages. P. Schad (2007) expresses it appositely in two sentences:

1. The soil must be classified twice, according to the national system and then according to the WRB 2006.

2. It is impossible to sound a strong enough warning against a simple translation of the names in one system into the other. The systems are too different in structure and in their limits.

WORKING METHOD WITH EXAMPLES

This WRB 2006 is now to be compared with the ÖBS 2000 in the light of seven case-studies with a view to achieving a certain parallelization of the Reference Soils Groups (RSG) to the soil types after the ÖBS 2000.

Even if only the difficulties are highlighted, the positive effect of an international understanding should not be forgotten.

Example 1:

Histosols are after WRB 2006 soils with thick organic layers. But in this case we have problems with alpine soils with a high content of organic material, e.g. some subtypes of Histic Leptosols, Lihic Leptosols or Histic Umbrisols. As these are very different from the Histosols and has a content of 30 percent or more organic matter in the fine earth, but not with water for 30 consecutive days or more in most years are saturated, would be advantageous as the criterion for water saturation for the separation of Terrestrial Soils to Subhydric Soils.

Example 2:

The Anthrosols are concisely defined in the WRB 2006 as soils with long and intensive agricultural use, with a hortic, irragric, plaggic or terric horizon 50 cm or more thick; or an anthraquic horizon and an underlying hydragric horizon with a combined thickness of 50 cm or more. Furthermore it

is stated that Anthrosols comprise soils that have been modified profoundly through humus activities, such as addition of organic material or houshold waster, irrigation and cultivation. When I compare these definitions with the defnition in the ÖBS 2000, there is a great deal of correlation between them. Here it is stated: Anthrosols are soils which have undergone a significant alteration because of continuous and/or intensive human activity. These alterations can be erosion and/or mixing of soil materials of natural origin or materials of a technogenic type, whereby an enrichment of organic substance and nutrients can take place. As technogenic material can be ignored here, a classification into the soil types Cultivated Initial Soil (*Kultur-Rohboden*) or Hortisol (*Gartenboden*) or Trench-ploughed Soil (*Rigolboden*) or Pile Soil (*Schüttungsboden* with the subtypes Dump Soil [*Planieboden*] and Levelling Soil [*Haldenboden*]) can be carried out with little difficulty. All of these soil types are in the order Terrestrial Soils and the class Kolluvien und Anthrosole.

Example 3:

The equally newly created RSG Technosols in the WRB 2006 represent a great easing in the parallelization with the ÖBS 2000.

Likewise in the order of Terrestrial Soils and class of Kolluvien and Anthrosole are the Disposal Soils (*Deponieboden*), which as a general characteristic can be recognised as having their origin and their properties from technogenic material. This definition approximates very closely to the one in the WRB 2006. In this it says: Soils containing many artefacts, 20 percent or more (by volume, by weighted average) artefacts in the upper 100 cm from the surface or to continuous rocks or a cemented or indurated layer, whichever is shallower; or a continuous, very slowly permeable to impermeable, constructed geomembrane of any thickness starting within 100 cm of the soil surface; or technic hard rock starting within 5 cm of the soil surface and covering 95 percent or more of the horizontal extent of the soil.

Example 4:

These comparisons should be followed by two equally positive examples, which are possible because of the new subdivision of pseudogleyic soils into Planosols and Stagnosols. As in Austria's Pseudogleys only in a few cases can the hitherto required clear faults in the texture be established – the old description was secondary Pseudogley – the temporary water-logging close to the surface was caused on the other hand by a dense structure, this division is very accommodating to the conditions in Austria. Thus we can classify a large part of the soils into the class of the Pseudogleys in the order of the Hydromorphic Soils Stagnosols. Table 1 should make this clear.

Table 1

Comparison of the definitions of the Stagnosols according to the WRB 2006 and the ÖBS 2000

WRB 2006	ÖBS 2000
Soils with stagnating water, with structural or moderate textural discontinuity, within 50 cm of the mineral soil surface in some parts reducing conditions for some time during the year and in half or more of the soil volume, single or in combination, a stagnic colour patter; or an albic horizon; and nor albeluvic tonguing starting within 100 cm of the soil surface. Stagnosols are soil with a perched water table showing redoximorphic features caused by surface water. Stagnosols are periodically wet and mottled in the topsoil and subsoil, with or without concretions and/or bleaching.	Soils in which the seepage water either builds up over a practically impermeable horizon or is retained in very slightly permeable topsoil as adhesive moisture. With greater quantities of water the overlying soil becomes more or less waterlogged and during dry periods the stagnant water disappears. The change from water-logging and dryness is characteristic of the water balance of these soils: during the damp phases reducing processes predominate and during the dry periods oxidising.

Example 5:

A problematic example should be added to these positive ones. This involves the case of the Cambisol. This is one of the most widely distributed and thereby one of the most important types in Central Europe – and not just in this region – and therefore has an abundance of subtypes and varieties.

This RSG, to my surprise, is described in the WRB 2006 at first as relitvely young soils or soils with little or no profile development, second as moderately developed soils. In addition having a cambic horizon starting within 50 cm of the soil surface and having its base 25 cm or more below the soil surface or 15 cm or more below any plough layer; or an anthraquic, hortic, hydragric, irragric, plaggic or terric horizon; or a fragic, petroplinthic, pisoplinthic, plinthic, salic or vertic horizon starting within 100 cm of the soil surface; or one or more layers with andic or vitric properties with a combined thickness of 15 cm or more within 100 cm of the soil surface.

In this connection, the first question to arise how «relatively young» is to be defined – with regard to the plio-pleistocene-boundary, glacial or interglacial age. Thus a separation of Paleosols and (recent) Cambisols would be understandable and also possible. In any case, according to the ÖBS

2000 Cambisols are mature soils with powerful B-horizons and a deep development profile, but very different from modern soils in the tropics.

Table 2 should provide information on the breadth and thereby also the difficulties of a parallelization.

Table 2

Possible soil types according to the ÖBS 2000, which correspond to the RSG Cambisols in the WRB 2006

WRB 2006	ÖBS 2000
Leptic Cambisol	Ranker
Calcaric Cambisol	Pararendzina
Cambisol	frequent Braunerde
Cambisol	Kalkbraunlehm, Kalkrotlehm
Stagnic Cambisol,	Typischer Pseudogley
Stagnic Cambisol	Stagnogley

Several possibilities are demonstrated on this, like the Cambisols according to the WRB 2006 can be transferred into Braunerden according to the ÖBS 2000; the great range of this conversion (and thereby also the possibilities for mistakes) can be seen. In this connection, another suggestion should be introduced. So with many soils – especially in alpine locations – a podzolic dynamic can be identified in a Bsh-horizon, furthermore in many Cambisols a distinct calcium carbonate content in the B-horizon. Therefore, among the prefix podzolic and calcaric (already available as suffixes) should be incorporated.

Example 6:

The next suggestion relates to colluvial soils. The writer is well aware of the difficulties involved with definition, but the possibility hitherto accepted, to describe an also correspondingly deep Colluvium is too weak. There is only the definition for colluvic material - material is formed by sedimentation through human-induced erosion. It normally accumulates in foot slope positions, in depressions or above hedge walls. The erosion may have taken place since Neolithic times. And for the second-level units of the WRB we can read that colluvic material, 20 cm or more thick, created by human-induced lateral movement.

What about the natural-induced materials (by water and/or by wind)? We found in Austria many sites with a very deep accumulation of eroded material, more than 100 cm thick, and for this soil is a prefix or suffix not sufficient. I propose a RSG Colluvisols.

Finally, one further suggestion:

We have difficulties with the parallelization of soils in higher alpine locations WRB 2006, as logically the WRB is focussed first and foremost on soils of intensive areas of the Earth and high regions are not taken into consideration or hardly at all. I see a solution to this question in an extension of prefixes and suffixes, as I have already briefly mentioned in the case of Cambisols. Thus a commission could concern itself with soils in higher situations and in this way undertake supplements for this attribute, so that these soils which are important to us – e.g. alpine pasture economics, water economy, recreational areas – can also be appropriately presented.

SUMMARY

In general exists a good parallelization between the RSG of the WRB 2007 with the Austrian Soil Classification 2000 especially due the new RSG Technosols and Stagnosols. The age of Cambisols and alpine soils must be discussed as well a new RSG Colluvisols.

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