"TUNDRA" AND THE "ARCTIC"

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As we begin the second CAVM workshop with the express purpose of writing map legends, it is appropriate to review our goals and immediate objectives, to reflect upon where we ought to be headed, and finally to determine how to get there.

The Arctic is a natural unit with much of the flora common throughout the region, albeit with variation, recognized and highlighted by subdivisions into phytogeographic zones and floristic provinces. Traditional methods of developing vegetation maps have been directed from the bottom-up; that is, from plot studies to regional generalizations through a series of increasingly synthetic aggregations. Another school of mapping has developed using wholly new data obtained by remote-sensing methods, which proceeds from the top-down using proxies for vegetation. Thus, the problem lies in tying those inclusive symbols to the traditionally-defined units on the ground.

Maps have been prepared at large and small scales for a variety of purposes, and taken together they very clearly show how differently the same patterns in nature can be portrayed. The CAVM was established to unify concepts and methods, and to integrate and apply the rich legacy of vegetation mapping to our task, which for the lack of ground-based information over large parts of the Arctic means dependence upon new technologies. Names applied to the subdivisions of Arctic and the descriptive terms in map legends reflect disparate methods and traditions, corresponding to the North American, Scandinavian, and Russian approaches.

Furthermore, the merger of information from such distinctly different sources as plot data on one hand with satellite imagery on the other challenges us to select informative terminology. Mixtures of terms that reflect abstract zones, physiography, plant life-form (physiognomy), dominant (primary) species, moisture regime, or successional stage have all been used to some degree and can even be found in a single classification. Whereas some terms have been so widely applied they cannot, without careful and explicit redefinition, be made more precise, others have been used for so long in such a restricted sense that they cannot now be applied more widely.

We must step back and reconsider the terminology with our original objectives in mind. Consensus is needed first for the terms *arctic* and *tundra*; Arctic is the region and tundra is the vegetation of that region. Once having fixed the usage of these terms, then others will logically follow. In some classifications, Arctic Tundra also designates a subzone of the Arctic and, similarly, tundra also refers to a community type. We must address this problem of dual meanings. It is essential to determine equivalents and, for CAVM purposes, to establish formal synonymies (e.g., for such terms as High Arctic, Polar Desert, and Northern High Arctic Tundra). For our current map-scale of 1:7,500,000, complex classifications must be collapsed into fewer units.

We propose that the term tundra be applied to all vegetation north of (and above) treeline as proposed by Gabriel and Talbot (1984, p. 116):

> *Tundra* - (1) From the Finnish 'tunturi', meaning a treeless plain and describes the landscape beyond the cold limits of tree growth. (2) a cold-climate landscape having vegetation without trees. The absence of trees is caused by a complex of conditions that is ultimately related to regional climate. This regional aspect distinguishes tundra from treeless bogs and similar local areas without trees due to edaphic extremes in areas that otherwise support a forest cover. (3) The landscape beyond the temperature limits of tree growth, both to the north [arctic tundra] and west of treeline in Alaska and at elevations above treeline on mountains [alpine tundra; brackets enclose our added text]. (4) The so-called 'barren ground' north of the circumpolar coniferous forests. (5) Treeless areas where dwarf shrubs and low herbaceous plants predominate, often with many lichens and mosses, on a permanently frozen subsoil.

Arctic Tundra, therefore, defines the totality of arctic vegetation north of treeline including polar deserts. For mapping at a scale of 1:7,500,000, it can be subdivided first into two basic components, High Arctic and Low Arctic in the manner of Bliss and Matveyeva (1992). Each of these can be similarly divided into two subunits, northern and southern, roughly following the Russian subzone boundaries. Then, to recognize a second level of complexity, floristic subdivisions at the rank of province can be superimposed over this structure. We fully realize that the term tundra has many other shades of meaning. However, if this broad definition can be accepted, the inconsistencies

among the various approaches to classifying arctic vegetation will vanish and a consistent nomenclature to describe zonal vegetation within the Arctic will be established.

In summary, the Arctic zone can be divided as follows:

High Arctic subzone,
- Northern High Arctic
- Southern High Arctic

Low Arctic subzone,
- Northern Low Arctic
- Southern Low Arctic.

Northern High Arctic is the latitudinal portion where polar desert vegetation *sensu* Bliss is the dominant vegetation on the placors or moderate sites. (= Yurtsev's high arctic tundra subzone, and Alexandrova's polar desert.) Southern High Arctic is the portion where polar semidesert sensu Bliss is the dominant vegetation on the placors. (= Yurtsev's northern and southern arctic tundra subzones.) Northern Low Arctic is the portion where the sedge-dwarf shrub tundras and steppe tundras (in Russia) are dominant on the placors (= Yurtsev's northern and middle hypoarctic tundra subzones.) Southern Low Arctic is the portion where the shrub tundras are dominant on the placors. We would include the Russian Stlaniks here since they consist of essentially shrub growth forms. (= Yurtsev's southern hypoarctic tundra subzone + Stlaniks.)

References

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BRAUN-BLANQUET SYNTAXA AND THEIR IMPORTANCE FOR THE LEGEND OF A CIRCUMPOLAR ARCTIC VEGETATION MAP

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Introduction

The same, simple but clear, vegetational language has to be spoken by the whole CAVM community. This is a *conditio sine qua non* for the achievement of an ecologically relevant 1:7,500,000-scale vegetation map.

The Braun-Blanquet vocabulary in particular should be part of this language, which might be derived from the results of the international workshop on Classification of the Arctic Vegetation in Boulder in 1992 (Walker *et al.* 1995) (See also Daniëls 1996).

Why Braun-Blanquet syntaxa?

The characteristic species combination including character, differential and constant companion species, make each Braun-Blanquet syntaxon a well-defined vegetation unit with its own typical ecology (cf. Westhoff and Van der Maarel 1978, Dierschke 1994). A variety of relevant vegetation-ecological information is hidden behind names such as Oxycocco-Sphagnetea Br.-Bl. et R. Tx. 1943, Caricion nardinae Nordh. 1935, or Rhododendro-Vaccinietum Daniëls 1982.

Moreover, the syntaxonomical nomenclature is unambiguous, which is quite an advantage when comparing vegetation units and landscapes of different regions for ecological evaluation.

For example, are the following equivalent vegetation types: biomorph vegetation type II4, the willow-scrub variant of the Southern hypoarctic tundras of Chukotka (Katenin 1996); the dwarf birch and willow-dwarf birch, shrub-graminoid-green moss, low hillocky tundras, mapping unit 4 of the West Siberian Tundra (Meltzer 1996); and the low, erect deciduous thicket tundra, low tundra of the Low Erect Shrub Zone (L), 2 (Edlund 1996)? What information is hidden behind these units? If they are the same, why do they not have the same name? If not, what