



## **Lateral enlargement of lithalsas indicated by observations from Hudsonia, Belgium and Wales**

A. Pissart

University of Liège, Belgium (a.pissart@ulg.ac.be)

The lithalsas in Hudsonie, northern Québec, Canada, are modern-day analogues to the features that formed the shallow depressions ('viviers') that occur today on the Hautes Fagnes, Belgium. Observations made in the two regions are complementary. They demonstrate that these periglacial mounds form first by vertical upheaving and later by lateral enlargement. The main observations in favour of this thesis are: 1) the regular morphology, either circular or oval, of both contemporary lithalsas and traces of previous lithalsas, cannot be explained by simple vertical heave; 2) the lateral extension of lithalsas, inferred from relict forms in the Hautes Fagnes, is clearly evident; 3) the ramparts cannot be explained in terms of simple erosion of the lithalsa surface and subsequent lateral downslope movement of material under gravity to form the ramparts because (i) very low slope angles are involved and (ii) thermokarst activity would have been initiated by the erosion; 4) the oblique inclination of ice lenses observed within a lithalsa in Hudsonie indicates that the freezing plane (i.e. the top of permafrost) on the sides of the mound was inclined.

On the other hand, well-developed benches and terraces developed in surficial materials on valley side slopes in central Wales (described in 1963) show the same lateral evolution. The features resemble large-scale earth garlands and range in form from lobate risers through to elongate lithalsa remnants. The summits of lobate forms contain thermokarst hollows; these have resulted from the melt of ice that would have formed in permafrost when the lobes developed. The depressions are best developed where lobes are large and elongate; they grade into depressions enclosed by ramparts aligned according to slope. This morphology, similar to lithalsa remnants known from the Hautes Fagnes and lithalsas from Hudsonie, demonstrates the lateral growth of lithalsas and shows that remnants of periglacial mounds are more frequent in Central Wales than it was previously known.

The periglacial process by which the lithalsas enlarge and the benches are moving down will be discussed.