Disponible en ligne sur www.sciencedirect.com
ScienceDirect
Revue de micropaléontologie 51 (2008) 133–166
Revue de micropaléontologie
http://france.elsevier.com/direct/REVMIC/

Original article

Pennsylvanian miospore assemblages from the Bèdero Section, Varese, Italian Southern Alps

Assemblages à miospores d'âge Pennsylvanien de la section de Bèdero, Varese, Alpes méridionales, Italie

Paola Pittau [a,*], Myriam Del Rio [a], Francesca Cotza [a], Ausonio Ronchi [b], Giuseppe Santi [b], Renato Giannotti [b]

[a] *Dipartimento di Scienze della Terra, Università degli Studi di Cagliari, Via Trentino 51, 09127 Cagliari, Italy*
[b] *Dipartimento di Scienze della Terra, Università di Pavia, Via Ferrata 1, 27100 Pavia, Italy*

Abstract

Thin continental Carboniferous sequences crop out sparsely in the western Southern Alps (Alpe Logone, Mesenzana, Grantola, Bosco Valtravaglia-Fabiasco, Val Tresa, etc.) and are currently the subject of a detailed litho- and biostratigraphic revision, to reconsider their chronological position with respect to previously published age constraints. The age of these Upper Palaeozoic sedimentary successions, scattered over a wide area and strongly tectonized along major structural lineaments, has long been debated between Westphalian and Stephanian. The present work focuses mainly on the palynology of the Brezzo di Bèdero section (Luino, Lake Maggiore). The recovered palynoflora is assigned to 42 spore genera and 76 species of which one genus and 10 species are newly proposed. Fifty-seven spore species and 19 pollen species are described and illustrated. Qualitatively, the Bèdero palynoflora shows strong affinities to those of Western Europe. The most abundant palynomorphs are trilete spores known to be characteristics of the late Westphalian and early Stephanian assemblages. These are characterized by the remarkable presence of *Florinites* and subordinately *Wilsonites* species, low numbers of *Potonieisporites*, rare *Limitisporites* and *Vesicaspora*, and very rare *Latensina-Cordaitina* pollen. The occurrence of diverse monolete spores *Laevigatosporites, Punctatosporites, Spinosporites, Thymospora* and *Torispora*, with common *Lundbladispora gigantea, L. simonii, Stenozonotriletes rubius* n. sp. together with the absence of plicate and taeniate pollen grains suggests a strong resemblance to the late Westphalian–early Stephanian interval assigned to the OT Zone of Western Europe. Variations in the quantitative composition can be likely attributed to variations in the environmental setting with regards to non-forming peat deposits. The palynological suite is indicative of the existence of a well-established lowland Cordaiteans vegetation and well settled pterophytic, pteridosperm and subordinately sphenophytic and lycophytic, hygrophytic plant communities.

Résumé

Des séquences continentales peu épaisses du Carbonifère supérieur qui affleurent de façon discontinue dans la partie occidentale des Alpes méridionales (Alpes de Logone, Mesenzana, Grantola, Bosco Valtraglia-Fabiasco, Val Tresa, etc.) font l'objet d'une révision lithostratigraphique et biostratigraphique détaillée afin de reconsidérer leur position chronologique. L'âge Westphalien ou Stéphanien de ces séquences sédimentaires – qui s'étendent sur une vaste région et montrent d'importantes déformations tectoniques le long de leurs plus grandes lignes structurales – a longtemps été discuté. Le travail présenté est principalement consacré à l'étude palynologique de la très intéressante section de Brezzo di Bedèro (Luino, lac Majeur). Quarante-deux genres et 76 espèces de spores dont un genre et dix espèces nouvelles ont pu être identifiés. Cinquante-sept espèces de spores et 19 espèces de pollen sont décrites et illustrées. D'un point de vue qualitatif, l'association palynologique de Bedèro montre de fortes affinités avec celle d'Europe occidentale. Les palynomorphes les plus abondants sont des spores trilètes typiques des associations du Westphalien supérieur et du Stéphanien inférieur. Ces associations se caractérisent par une présence importante de *Florinites* et dans une plus faible proportion de *Wilsonites*, un faible nombre de *Potonieisporites*, de rares *Limitisporites* et *Vesicaspora*, ainsi que de très rares pollens *Latensina-Cordaitina*. La présence de spores monolètes divers telles que Laevigatosporites, Punctatosporites, Spinosporites, Thymospora et Torispora, avec de fréquents *Lundbladispora gigantea*, *L. simonii*, *Stenozonotriletes rubius* n. sp., ainsi que l'absence de pollens pliqués et ataeniates suggèrent

* Corresponding author.
E-mail address: pittaup@unica.it (P. Pittau).

0035-1598/$ – see front matter © 2007 Elsevier Masson SAS. All rights reserved.
doi:10.1016/j.revmic.2007.11.001

un intervalle de temps attribué à la zone OT de l'Europe occidentale, comprise entre le Westphalien supérieur et le Stéphanien inférieur. Des variations quantitatives de la composition des assemblages peuvent être attribuées à des variations environnementales par rapport aux dépôts de tourbe typiques de l'Europe occidentale. L'association palynologique indique une végétation de plaine alluviale riche en Cordaites, avec une communauté bien établie de plantes hygrophiles comme les Ptéridophytes, les Ptéridospermaphytes et, en moindre proportion, les Sphénophytes et les Lycophytes.

Keywords: Palynology; Stratigraphy; Biostratigraphy; Carboniferous; Southern Alps

Mots clés : Palynologie ; Stratigraphie ; Biostratigraphie ; Carbonifère ; Alpes méridionales

1. Introduction

During the last two years, palynological studies have been undertaken on the scattered and thin continental successions of the western sector of the Southern Alps (Fig. 1), between Lake Maggiore and Lake Como, where the onset of the first tectono-sedimentary megacycle began during the Pennsylvanian. In northern Italy, Carboniferous rocks crop out largely in the western and eastern sectors of the Southern Alps, these strata representing the oldest deposits overlying the Variscan metamorphic basement. Eastwards, in the Carnic Alps, two km-thick prominent shallow-marine fossiliferous sequences, encompassing Moscovian-Ghzelian to Artinskian age crop out extensively (see e.g., Venturini *in* Cassinis et al., 1998, and Vai and Venturini, 1997 for a good review). Cantabrian (late Moscovian to early Kasimovian, early Stephanian) macrofloral remains were further reported from the Meledis Formation (Vai et al., 1980) whereas oldest, Duckmantian miospore assemblages were described in the lowermost Bombaso Formation (Francavilla, 1966) and were consistent with the age based on fusulinids. In northeastern Italy, the syn-orogenic and post-orogenic marine successions presumably range in age from Namurian to Duckmantian. Westwards, Pennsylvanian rocks occur sparsely over a wide area, between Lake Maggiore and Lake Como, along the Lake Lugano sector, the Varesotto region (NW Lombardy) and the Canton Ticino close to the Manno village (Switzerland). These successions consist of very coarse (conglomeratic) and medium- to fine-grained alluvial-to-lacustrine siliciclastics with horizons rich in plant remains (Venzo and Maglia, 1947; Venzo, 1951; Jongmans, 1950, 1960). To date, the most fossiliferous sites occur in Val Sanagra (Alpe Logone) and in the Varesotto areas.

The palaeontologic occurrences in the westernmost Carboniferous of Southern Alps, such as those of Mesenzana, Grantola, Bosco Valtravaglia-Fabiasco and Val Tresa have not been studied with respect to their detailed lithology and biostratigraphy. Consequently, the new palynological occurrence in

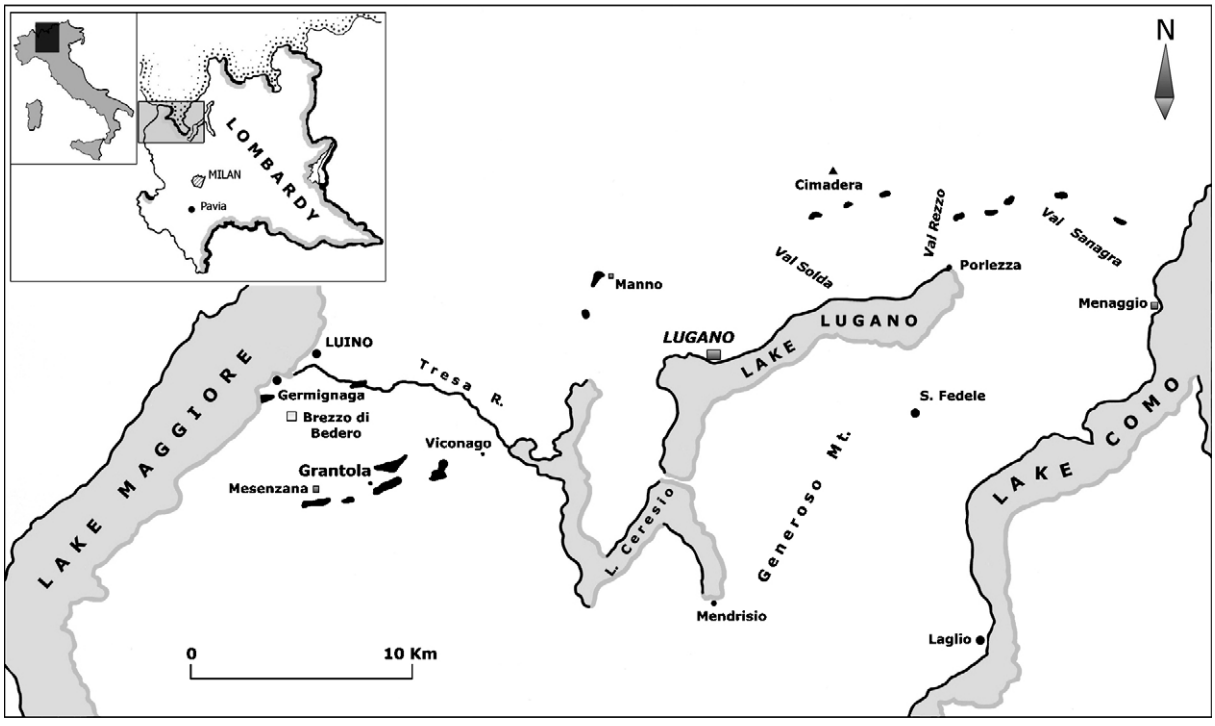

Fig. 1. Location of the investigated section and of the Upper Carboniferous-to-Lower Permian outcrops in the western sector of the Southern Alps (from Commissione Geologica Svizzera, 1955, Carta geologica generale della Svizzera 1:200,000 Foglio 7 "Ticino").

Fig. 1. Localisation de la coupe étudiée dans le secteur ouest des Alpes méridionales (d'après la Commission Suisse de Géologie, 1955, Carte Géologique de la Suisse 1:200 000, feuille 7 « Ticino »).