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Turonian flora from the fossiliferous flints of Châtellerault (western France)

Flore turonienne des silex fossilifères de Châtellerault (Ouest de la France)

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ABSTRACT

Three new localities yielding fossiliferous flints are reported from the Châtellerault area (Vienne, western France). They include one archaeological site (La Grande Vallée) and two zones with alterite deposits (L'Aunas and Les Bariollières). Broken surfaces of flint nodules show co-occurrence of marine invertebrates such as bryozoans, echinoids (*Micraster* Agassiz, *Orthopsis* Cotteau), gastropods (*Acteonella* d'Orbigny), rudists, and sponges. The association of *Acteonella*, *Micraster* and *Orthopsis* confirms the Turonian age (Upper Cretaceous) of the fossil assemblage. The marine invertebrates co-occur with plant macroremains including fragments of conifer leafy axes such as *Brachyphyllum*? Brongn., *Frenelopsis* (Schenk) *emend.* J. Watson and *Geinitzia* Endl., as well as fragments of angiosperm leaves. Plant remains are preserved as siliceous permineralizations, showing the gross morphology and all tissues in three dimensions. The fossil assemblage suggests that sediments were deposited proximally along the shoreline in shallow environment influenced by both continental and marine inputs. This coastal area was close to a conifer-dominated forest ecosystem, *Geinitzia* being probably one of the main components of the flora.

Mots clés :
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RÉSUMÉ

Trois nouvelles localités livrant des silex fossilifères sont signalées dans le secteur de Châtellerault (Vienne, Ouest de la France). Elles incluent un site archéologique (La Grande Vallée) et deux zones à dépôts d'altérites (L'Aunas and Les Bariollières). Les surfaces brisées des nodules de silex montrent une co-occurrence d'invertébrés marins tels que des bryozoaires, des échinides (*Micraster* Agassiz, *Orthopsis* Cotteau), des éponges, des gastéropodes (*Acteonella* d'Orbigny) et des rudistes. L'association d'*Acteonella*, de *Micraster* et d'*Orthopsis* confirme l'âge Turonien (Crétacé supérieur) de l'assemblage fossile. Aux invertébrés marins s'ajoutent des macrorestes végétaux, qui correspondent à des fragments d'axes feuillés de conifères, dont *Brachyphyllum* ? Brongn., *Frenelopsis* (Schenk) *emend.* J. Watson et *Geinitzia* Endl., ainsi que des fragments de feuilles d'angiospermes. Les restes de

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plantes sont préservés sous forme de perminéralisations siliceuses, montrant une préservation en trois dimensions de la morphologie générale et des tissus. L'assemblage fossile suggère que les sédiments ont été déposés le long d'une côte, dans un environnement proximal peu profond, influencé à la fois par des apports marins et terrestres. Cette zone côtière était proche d'un écosystème forestier à conifères, où *Geinitzia* était probablement une des composantes principales de la flore.

1. Introduction

Over recent decades, more than fifteen localities yielding mid-Cretaceous (Albian–Cenomanian) plant beds were reported from western France (e.g., Berthelin and Pons, 1999; Girard et al., 2013; Pons, 1979; Saint-Martin et al., 2013; Valentin et al., 2014). They are mainly located in the Aquitaine Basin, in the Charente and Charente-Maritime departments (Coiffard et al., 2009; Gomez et al., 2004, 2008; Néraudeau et al., 2005, 2009, 2013; Perrichot, 2005). Commonly, fossiliferous beds consist of clay and lignite providing abundant plant macroremains preserved as impressions or compressions with or without cuticles. More rarely, Albian–Cenomanian plants are preserved as siliceous permineralizations showing details of inner tissues (Moreau et al., 2014a, 2014b, 2015). By contrast with mid-Cretaceous, the Upper Cretaceous plant beds are rarer in western France. Only three Turonian-Coniacian localities were studied, Sainte-Mondane in Dordogne (Néraudeau et al., 2016), then Claix and Torsac in Charente (Moreau et al., 2016; Néraudeau, 2014; Fig. 1). Remains from Sainte-Mondane consist of isolated foliar cuticles whereas those from Claix and Torsac are permineralized.

Here, we report three new localities yielding Turonian plant-bearing flints from the Châtellerault area. The Upper Cretaceous Laurasian floras being weakly documented, this paper aims to describe these terrestrial plants, compare them with pre-Turonian and Turono-Coniacian floras, and discuss palaeoenvironmental/palaeoecological insights.

2. Geographical and geological setting

The study area is located in the northern part of the Seuil du Poitou that corresponds to the transition between the Paris Basin and the Aquitaine Basin (Vienne department, western France; Fig. 1). The plant-bearing flints described in the present paper were all collected in nodules coming from the upper Turonian deposits of the Châtellerault area. These deposits consist of a residual formation that constitutes the top of cuestas and plateaus (Bourgueil et al., 1976; Médioni, 1974). It displays yellow to red clay containing yellow to brown flints and decalcified rocks. This formation is not well developed and do not exceed some metres in thickness (Bourgueil et al., 1976). Bioclasts are not abundant into the flints, being limited to some bivalves, bryozoans, echinoids and siliceous sponges (Alcaydé and Joubert, 1987; Bourgueil et al., 1976; Carioux and Joubert, 1989). Plants come from three localities including one archaeological site and two

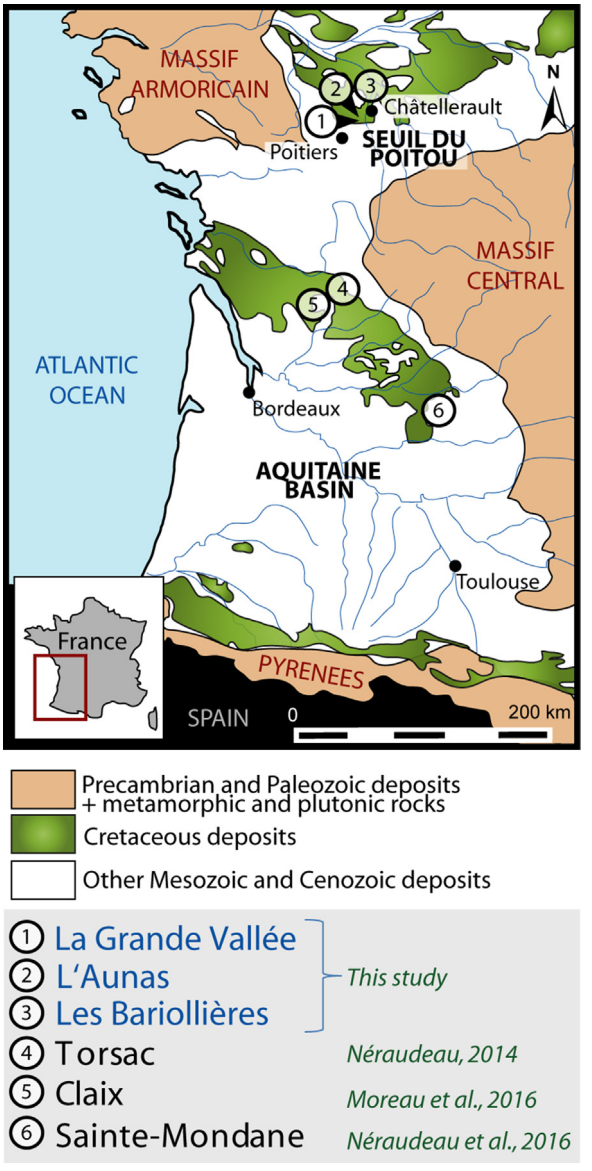

Fig. 1. Geological map of western France showing position of the Turonian-Coniacian plant localities included the three new sites from the Châtellerault area (La Grande Vallée, Les Bariollières, and L'Aunas).
Fig. 1. Carte géologique de l'Ouest de la France, indiquant la position des localités à plantes turono-coniaciennes, incluant les trois nouveaux sites du secteur de Châtellerault (La Grande Vallée, Les Bariollières et L'Aunas).

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