The Cadomian orogeny in the North Armorican Massif: a brief review

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The North Armorican Massif (NAM) of NW France is the type locality of the late Precambrian Cadomian orogenic belt. The NAM largely escaped reworking during the Upper Palaeozoic Variscan cycle, with the result that earlier geological relationships are commonly preserved intact. A large part of the Cadomian belt of the NAM comprises variably deformed and metamorphosed supracrustal rocks of the Brioverian succession (Barrois 1895, 1896, 1908; Graindor 1957; Cogne 1962; Le Corre 1977; Rabu et al. 1982, 1983; Chantraine et al. 1982). The Cadomian orogeny, which takes its name from Cadomus (Caen) in Normandy, was defined by Bertrand (1921) as the late Precambrian orogeny which in the NAM resulted in the folding and uplift of the Brioverian succession, prior to the deposition of Lower Palaeozoic red-bed sequences. Events which have been ascribed to the Cadomian orogeny span the period c. 700-425 Ma, during which time the Brioverian was heterogeneously deformed and metamorphosed, and intruded by calc-alkaline igneous complexes. The evolution of the belt has been interpreted in terms of the gradual cratonization of calc-alkaline are complexes and syn-orogenic sediments in an Andean-type continental margin (Brown et al. 1990; Dupret et al. 1990).

This contribution reviews briefly the geology of the Cadomian belt of the NAM (Fig. 1) and outlines some of the more controversial debates concerning the distribution and status of pre-Cadomian basement, the stratigraphy of the Brioverian succession, the nature of Cadomian magmatism, the kinematic significance of major structures and the geotectonic setting of the component parts of the belt.

Distribution and status of pre-Cadomian basement

The existence of small areas of pre-Cadomian basement in the Channel Islands, at La Hague and in the Tregor region (Fig. 1) has been confirmed on the basis of isotopic evidence. Poorly constrained Rb-Sr whole rock isochron

from the Icart granitic gneiss of Guernsey (Adams 1967, 1976) and similar lithologies from La Hague (Leutwein et al. 1973). U-Pb zircon dating has confirmed the antiquity of the Icart gneiss (2018 ± 15 Ma, Calvez & Vidal 1978) and established the existence of similar aged gneisses as enclaves within the Cadomian Perros-Guirec complex of the Tregor region (1790 ± 10 Ma, Auvray et al. 1980a). Gibbons & Power (1975) have argued that the gneisses of Sark are also a part of this pre-Cadomian basement, although these rocks remain undated by isotopic methods. The extent of these basement gneisses beneath the Cadomian belt is uncertain. Vidal et al. (1981) considered that the low initial 87Sr/86Sr ratios (0.702-0.716) displayed by Cadomian intrusions in the NAM precluded the presence of extensive areas of continental basement at depth. The NE-SW trending belt of basement gneisses exposed between La Hague and the Tregor region has accordingly been interpreted by some workers (e.g. Rabu et al. 1990) as a fragment of c. 2000 Ma Gondwanan basement detached from the African craton. However, initial 87Sr/86Sr ratios may not be used to fully constrain the extent of crustal involvement in magma genesis (Brown et al. 1990) and large areas of continental basement may therefore lie beneath the Cadomian belt of Brittany and Normandy, Sm/Nd studies currently in progress (R. S. D'Lemos pers. comm.) may help to resolve this problem. A complex sequence of variably deformed

ages of 2600-2000 Ma were initially obtained

A complex sequence of variably deformed calc-alkaline granitoids, amphibolites and quartz diorites exposed on the east side of the Baie de St Brieuc (Fig. 1) were formerly thought to have a minimum age of c. 1200–900 Ma (Leutwein et al. 1968; Roach et al. 1972), and to represent the type area of a pre-Cadomian 'Pentevrian' basement (Cogne 1959, 1962, 1964). The westernmost components of this igneous complex are probably overlain unconformably by the Brioverian succession in this area (Brown & Roach 1972; Roach et al. 1986, 1988; Strachan & Roach 1990; see however Bale & Brun 1983). Isotopic work has, however,

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Phanerozoic Reef Patterns Wolfgang Kiessling, Erik Flügel, Jan Golonka, 2002 The Variscan Orogen of Central Europe Ulf Linnemann, 2025-08-27 The book is written by international team of specialized geoscentists and represents the current knowledge of the evolution of the Variscan Orogen in Central Europe After a preface the geotectonic position of the mountain belt within the supercontinent Pangea and the zoning of the orogen is described Chapter 1 The birth of the Central European Variscides and the role of the Avalonian and Cadomian orogenic processes as forerunners of the Central European Variscides is presented also in Chapter 1 The big building blocks of the Variscan orogen north and south of the Rheic suture are lined out in detail in the main part of the book Chapters 2 to 18 After the description of the igneous activity in Permo Carboniferous time Chapter 19 neotectonic reactivation Chapter 20 current models for Variscan orogenic processes Chapter 21 and the zircon data base Chapter 22 are briefly characterized A final major section Chapters 23 to 29 includes geobiological palaeontological and palaeoenvironmental data including event stratigraphy relevant for Variscan plate tectonics. The book is written for an international readership of professional geoscientists of students of natural sciences and of people interested in the formation and geology of Central Europe The Evolution of the Rheic Ocean Ulf Linnemann, 2007 Geological evolution of middle to late Paleozoic rocks in the Avalon terrane of northern mainland Nova Scotia Canadian Appalachians a record of tectonothermal activity along the northern margin of the Rheic Ocean in the Appalachian Caledonide orogen Special Publication - Society of Economic Paleontologists and Mineralogists .1974

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Table of Contents The Cadomian Orogeny Geological Society Special Publication Ser

- 1. Understanding the eBook The Cadomian Orogeny Geological Society Special Publication Ser
 - The Rise of Digital Reading The Cadomian Orogeny Geological Society Special Publication Ser
 - Advantages of eBooks Over Traditional Books
- 2. Identifying The Cadomian Orogeny Geological Society Special Publication Ser
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
- 3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an The Cadomian Orogeny Geological Society Special Publication Ser
 - User-Friendly Interface
- 4. Exploring eBook Recommendations from The Cadomian Orogeny Geological Society Special Publication Ser
 - Personalized Recommendations
 - The Cadomian Orogeny Geological Society Special Publication Ser User Reviews and Ratings
 - The Cadomian Orogeny Geological Society Special Publication Ser and Bestseller Lists
- 5. Accessing The Cadomian Orogeny Geological Society Special Publication Ser Free and Paid eBooks
 - The Cadomian Orogeny Geological Society Special Publication Ser Public Domain eBooks
 - The Cadomian Orogeny Geological Society Special Publication Ser eBook Subscription Services
 - The Cadomian Orogeny Geological Society Special Publication Ser Budget-Friendly Options
- 6. Navigating The Cadomian Orogeny Geological Society Special Publication Ser eBook Formats
 - ePub, PDF, MOBI, and More
 - The Cadomian Orogeny Geological Society Special Publication Ser Compatibility with Devices
 - The Cadomian Orogeny Geological Society Special Publication Ser Enhanced eBook Features
- 7. Enhancing Your Reading Experience

- Adjustable Fonts and Text Sizes of The Cadomian Orogeny Geological Society Special Publication Ser
- Highlighting and Note-Taking The Cadomian Orogeny Geological Society Special Publication Ser
- Interactive Elements The Cadomian Orogeny Geological Society Special Publication Ser
- 8. Staying Engaged with The Cadomian Orogeny Geological Society Special Publication Ser
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers The Cadomian Orogeny Geological Society Special Publication Ser
- 9. Balancing eBooks and Physical Books The Cadomian Orogeny Geological Society Special Publication Ser
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection The Cadomian Orogeny Geological Society Special Publication Ser
- 10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
- 11. Cultivating a Reading Routine The Cadomian Orogeny Geological Society Special Publication Ser
 - Setting Reading Goals The Cadomian Orogeny Geological Society Special Publication Ser
 - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of The Cadomian Orogeny Geological Society Special Publication Ser
 - Fact-Checking eBook Content of The Cadomian Orogeny Geological Society Special Publication Ser
 - Distinguishing Credible Sources
- 13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development
 - Exploring Educational eBooks
- 14. Embracing eBook Trends
 - Integration of Multimedia Elements
 - Interactive and Gamified eBooks

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