

# Atlas of Phanerozoic Rainfall Maps

Mollweide Projection

CR Scotese, PALEOAMP Project  
TL Moore, PaleoTerra



## Atlas of Phanerozoic Rainfall Maps

This Atlas of Phanerozoic Rainfall Maps shows the pattern of mean annual rainfall for 22 time periods from the base of the Cambrian (542 Ma) to the Middle/Late Miocene (Serravallian & Tortonian, 10.5 Ma), plus one additional map for the Neoproterozoic (Middle Ediacaran, 600 Ma). The light blue squares indicate the amount of rainfall. The areas shaded in green on the maps are regions where precipitation exceeds evaporation ( $P > E$ ). The land areas in brown and tan on the map are regions where evaporation exceeds precipitation ( $E > P$ ).

The plate tectonic and paleogeographic maps are the work of C. R. Scotese. The paleoclimate simulations were done by T.L. Moore, using the FOAM (Fast Ocean and Atmosphere) Climate Simulation Program.

Some interesting patterns are apparent on all the maps. On the continents, Equatorial Everwet Belt generally spans latitudes, 15N – 15S. The Temperate wet belt is more variable, but generally spans the latitudes 45 – 75(N & S). In the oceans there are often noticeable gaps in precipitation apparent along the Equator and along the western sides of continents in the southern hemisphere. These gaps in precipitation are due to the chilling effect of oceanic upwelling, which reduces evaporation, and hence decreases precipitation.

The maps are from volumes 1-6 of the PALEOMAP PaleoAtlas for ArcGIS (Scotese, 2014). Absolute age assignments are from Gradstein, Ogg & Smith (2008).

The following maps are included in the Atlas of Cambrian and Early Ordovician Paleogeographic Maps:

- Map 5 Middle/Late Miocene (Serravallian & Tortonian, 10.5 Ma)
- Map 7 Early Miocene (Aquitainian & Burdigalian, 19.5 Ma)
- Map 9 Early Oligocene (Rupelian, 31.1 Ma)
- Map 12 early Middle Eocene (middle Lutetian, 44.6 Ma)
- Map 17 Late Cretaceous (Maastrichtian, 68 Ma)
- Map 21 Mid-Cretaceous (Turonian, 91.1 Ma)
- Map 23 Early Cretaceous (late Albian, 101.8 Ma)
- Map 27 Early Cretaceous (early Aptian, 121.8 Ma)
- Map 31 Early Cretaceous (Berriasian, 143 Ma)
- Map 35 Late Jurassic (Oxfordian, 158.4 Ma)
- Map 39 Early Jurassic (Toarcian, 179.3 Ma)
- Map 45 Late Triassic (Carnian, 222.6 Ma)
- Map 49 Permo-Triassic Boundary (251 Ma)
- Map 54 Early Permian (Artinskian, 280 Ma)
- Map 57 Late Pennsylvanian (Gzhelian, 301.2 Ma)
- Map 63 Middle Mississippian (early Visean, 341.1 Ma)
- Map 65 Late Devonian (latest Famennian, 359.2 Ma)
- Map 70 Early Devonian (Emsian, 394.3 Ma)
- Map 75 Early Silurian (late Llandovery, 432.1 Ma)
- Map 82 Tremadoc (480 Ma)
- Map 88 Cambrian – Precambrian Boundary (542 Ma)
- Map 90 Late Neoproterozoic (Middle Ediacaran, 600 Ma)

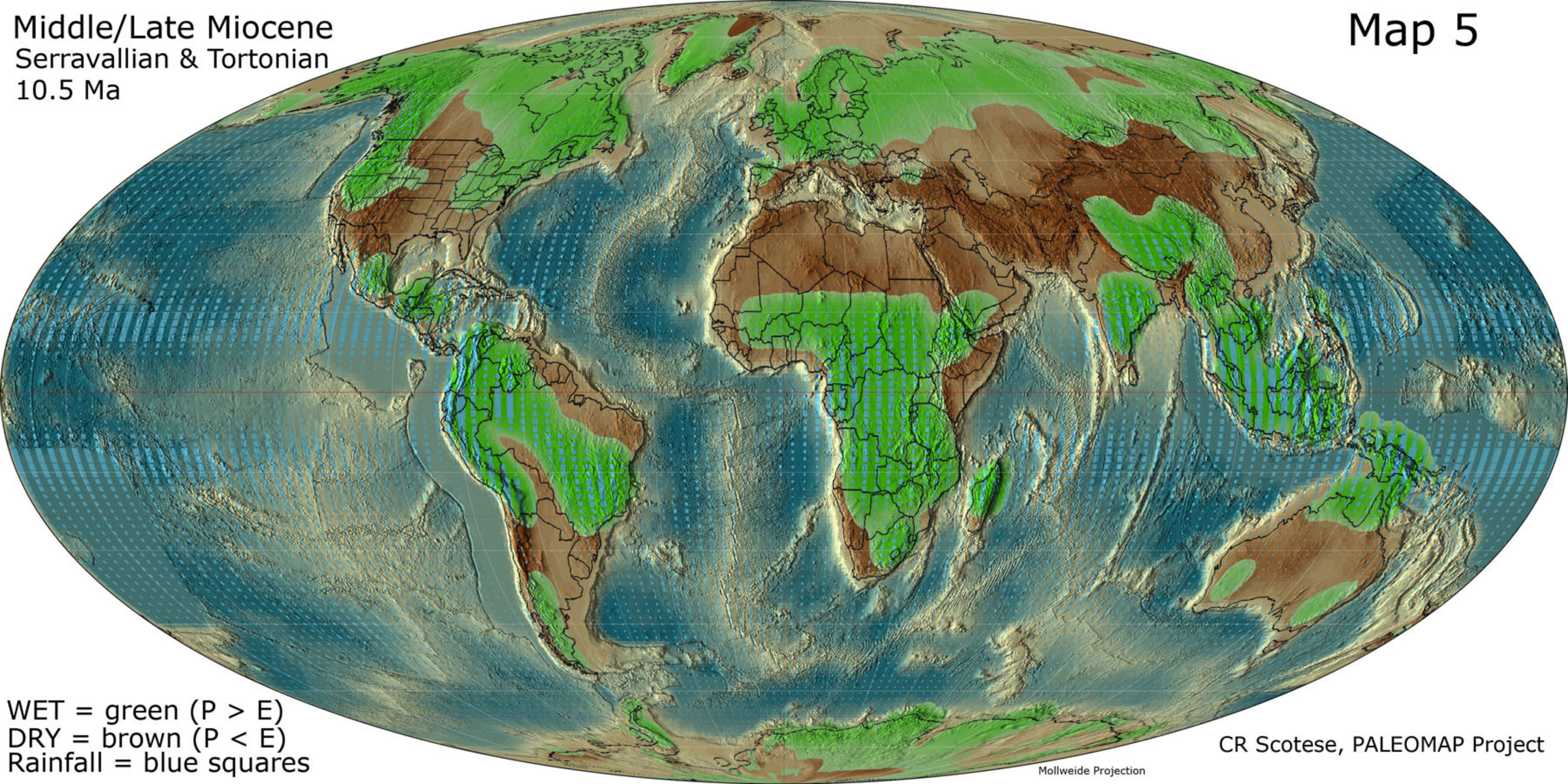
This work should be cited as

Scotese, C.R., 2014. Atlas of Phanerozoic Rainfall Maps (Mollweide Projection), Volumes 1-6, PALEOMAP Atlas for ArcGIS, PALEOMAP Project, Evanston, IL.



Middle/Late Miocene  
Serravallian & Tortonian  
10.5 Ma

Map 5



WET = green ( $P > E$ )  
DRY = brown ( $P < E$ )  
Rainfall = blue squares

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Early Miocene  
Aquitanian & Burdigalian  
19.5 Ma

Map 7

Map in Preparation

WET = green ( $P > E$ )  
DRY = brown ( $P < E$ )  
Rainfall = blue squares

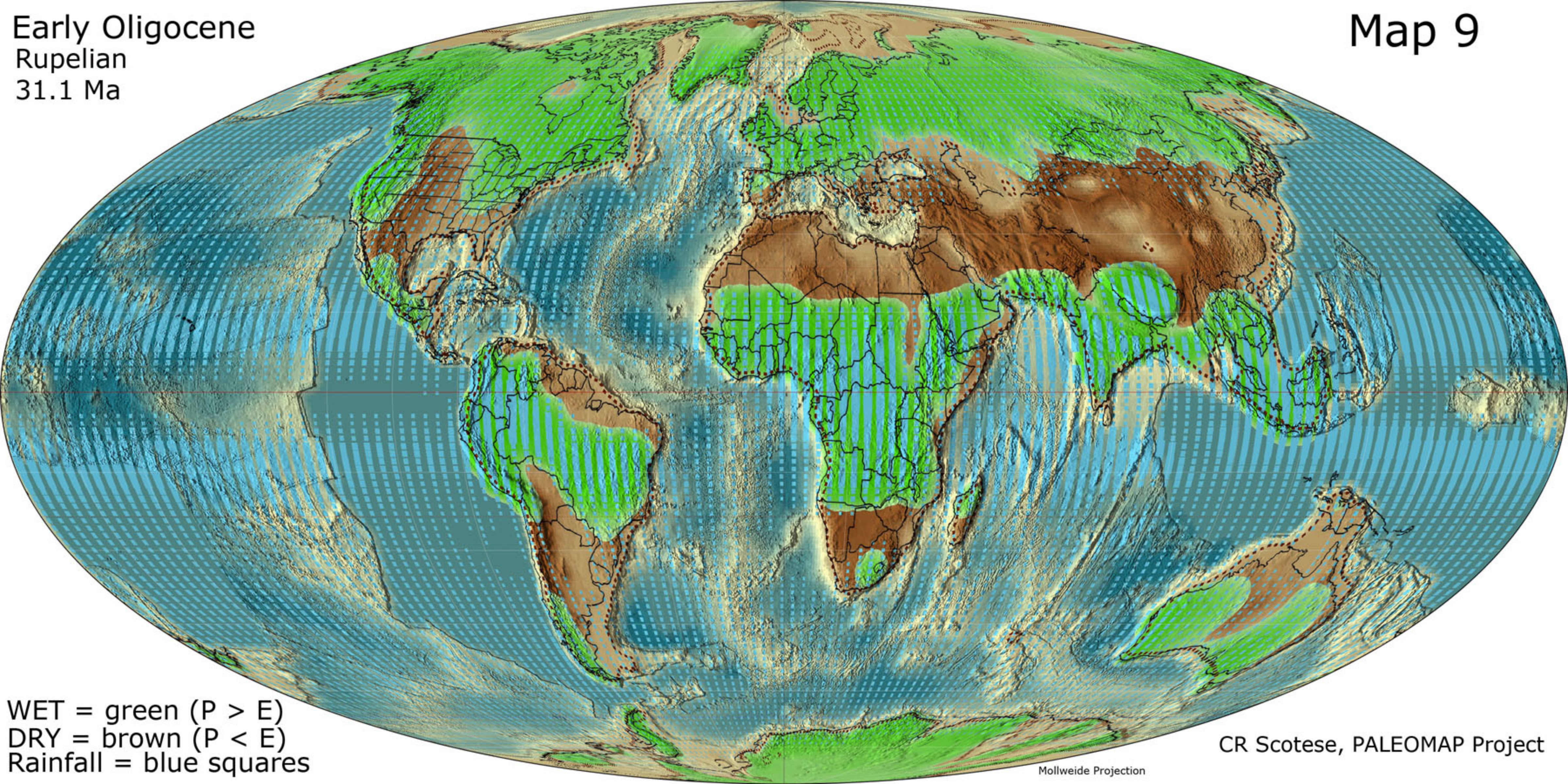
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Early Oligocene  
Rupelian  
31.1 Ma

Map 9



WET = green ( $P > E$ )  
DRY = brown ( $P < E$ )  
Rainfall = blue squares

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early Middle Eocene  
middle Lutetian  
44.6 Ma

Map 12

Map in Preparation

WET = green ( $P > E$ )  
DRY = brown ( $P < E$ )  
Rainfall = blue squares

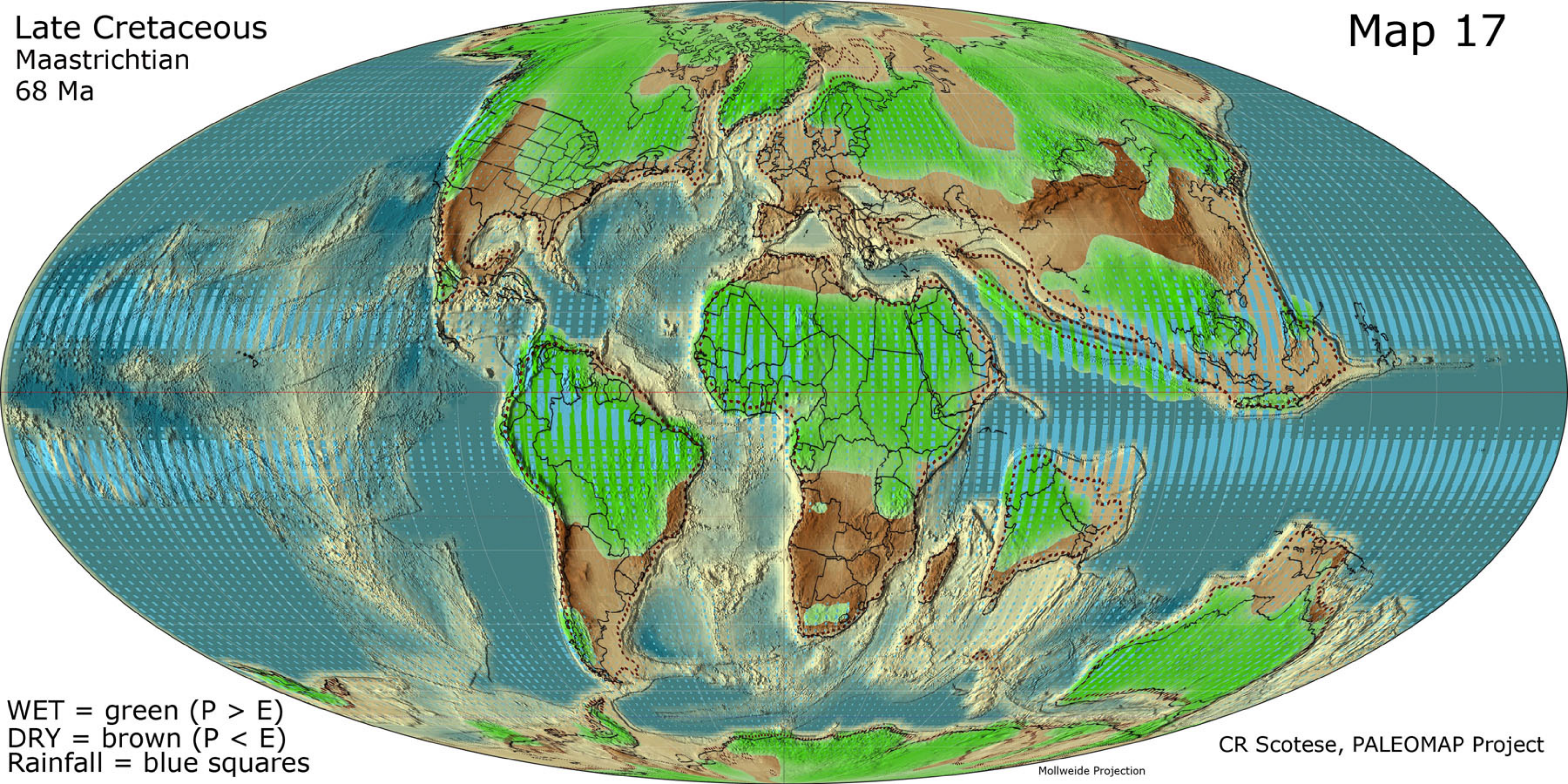
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Late Cretaceous  
Maastrichtian  
68 Ma

Map 17



WET = green ( $P > E$ )  
DRY = brown ( $P < E$ )  
Rainfall = blue squares

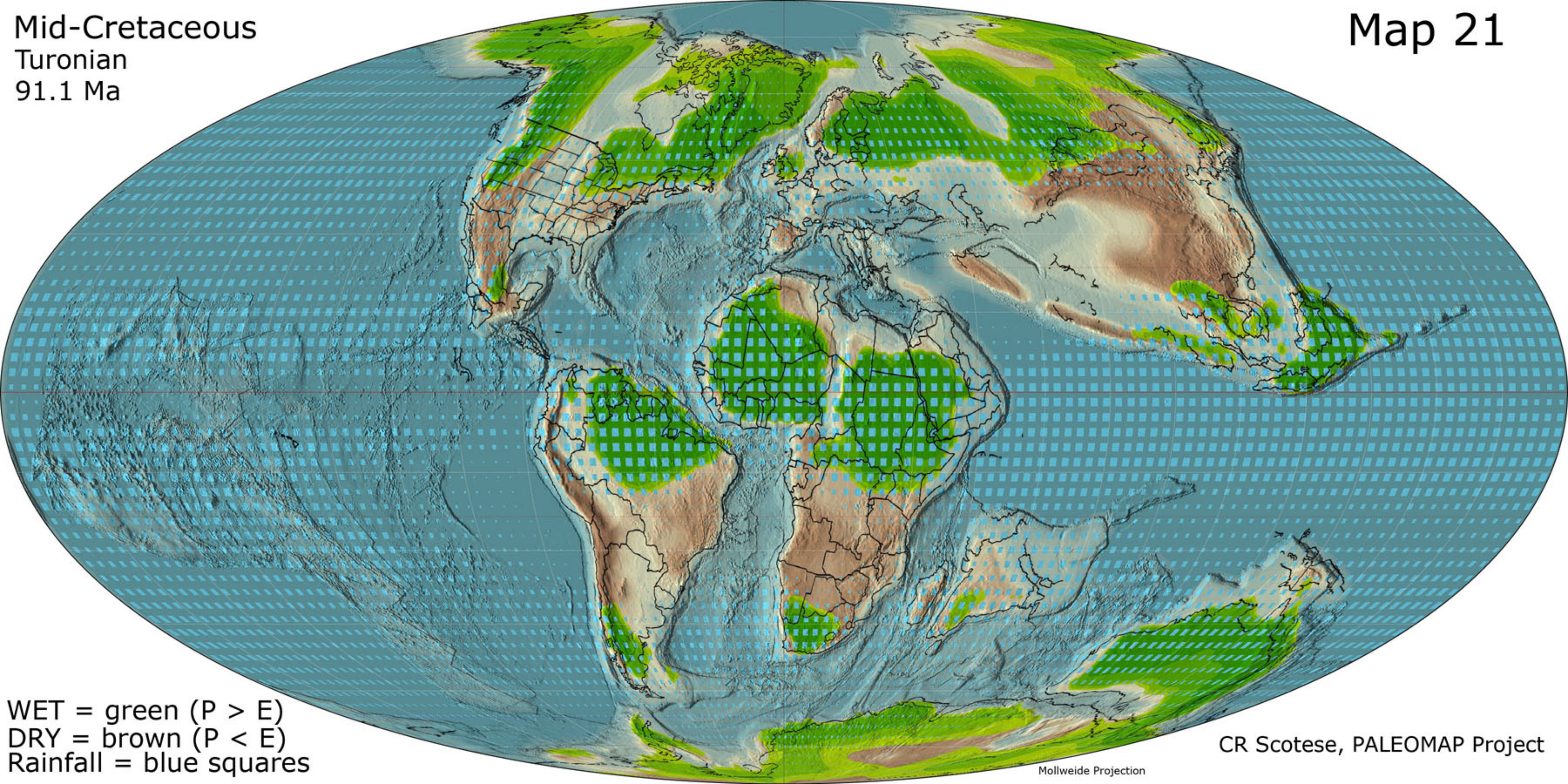
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Mid-Cretaceous  
Turonian  
91.1 Ma

Map 21



WET = green ( $P > E$ )  
DRY = brown ( $P < E$ )  
Rainfall = blue squares

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Early Cretaceous  
late Albian  
101.8 Ma

Map 23

Map in Preparation

WET = green ( $P > E$ )  
DRY = brown ( $P < E$ )  
Rainfall = blue squares

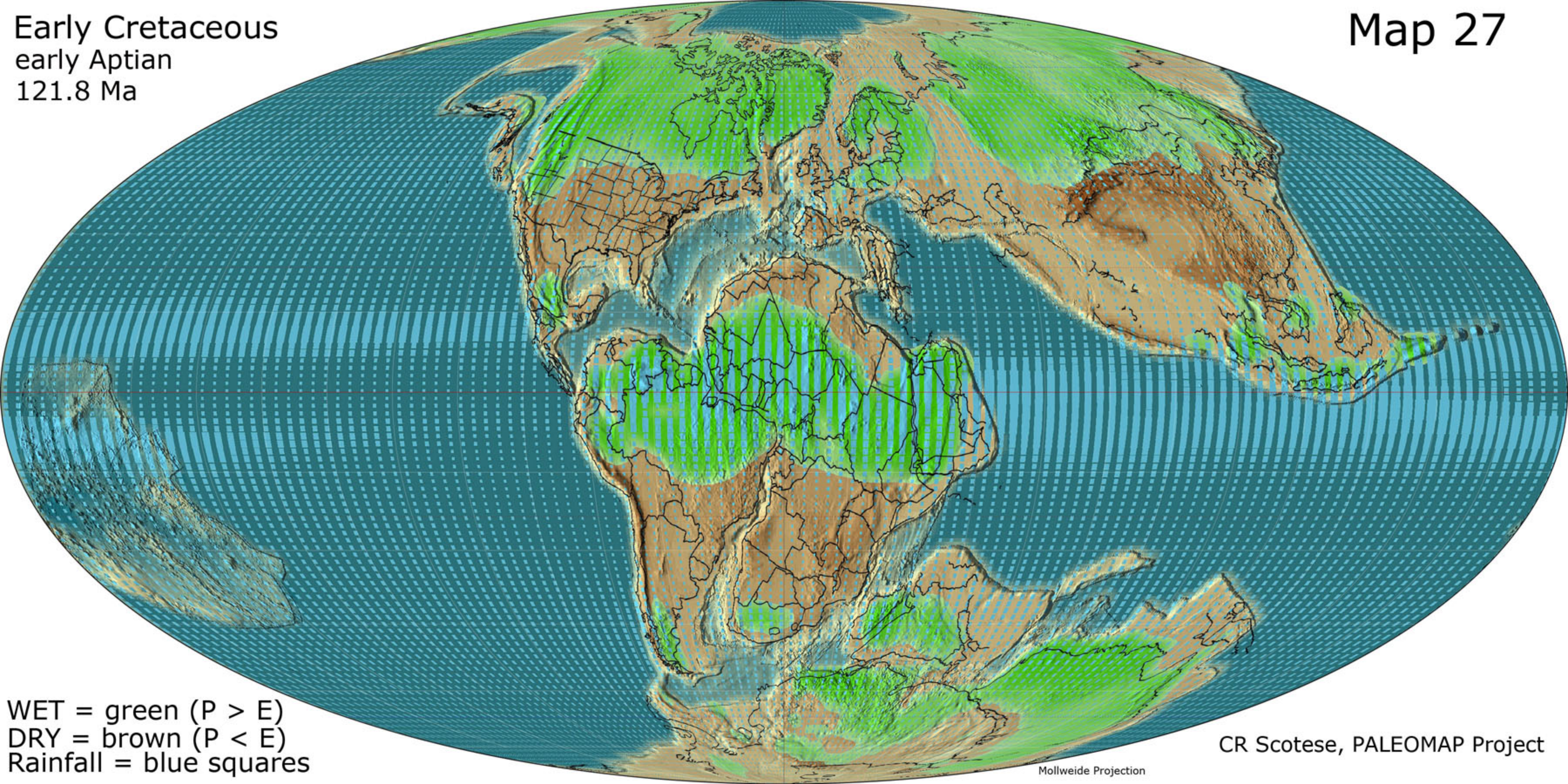
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Early Cretaceous  
early Aptian  
121.8 Ma

Map 27



WET = green ( $P > E$ )  
DRY = brown ( $P < E$ )  
Rainfall = blue squares

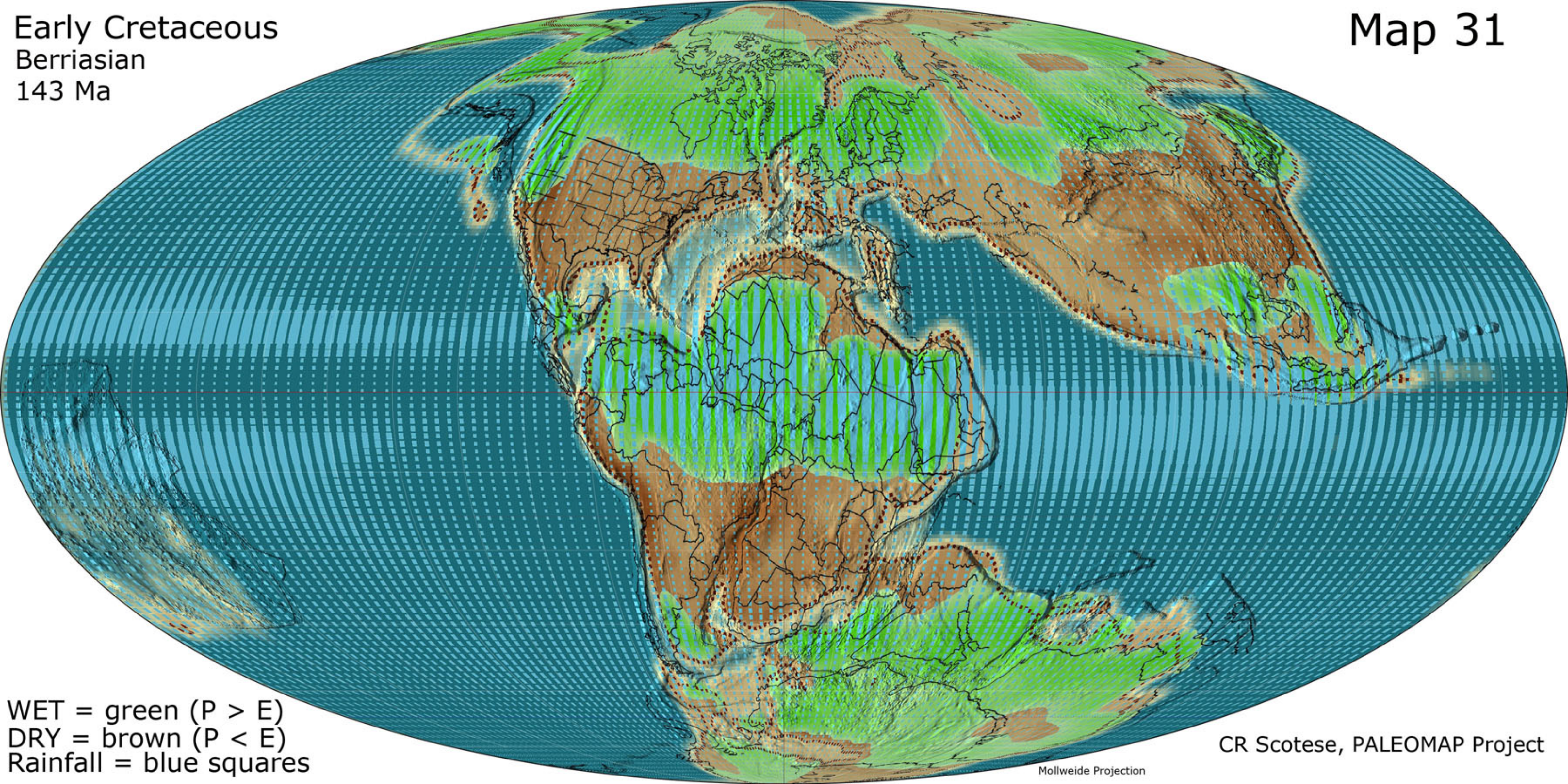
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Early Cretaceous  
Berriasian  
143 Ma

Map 31

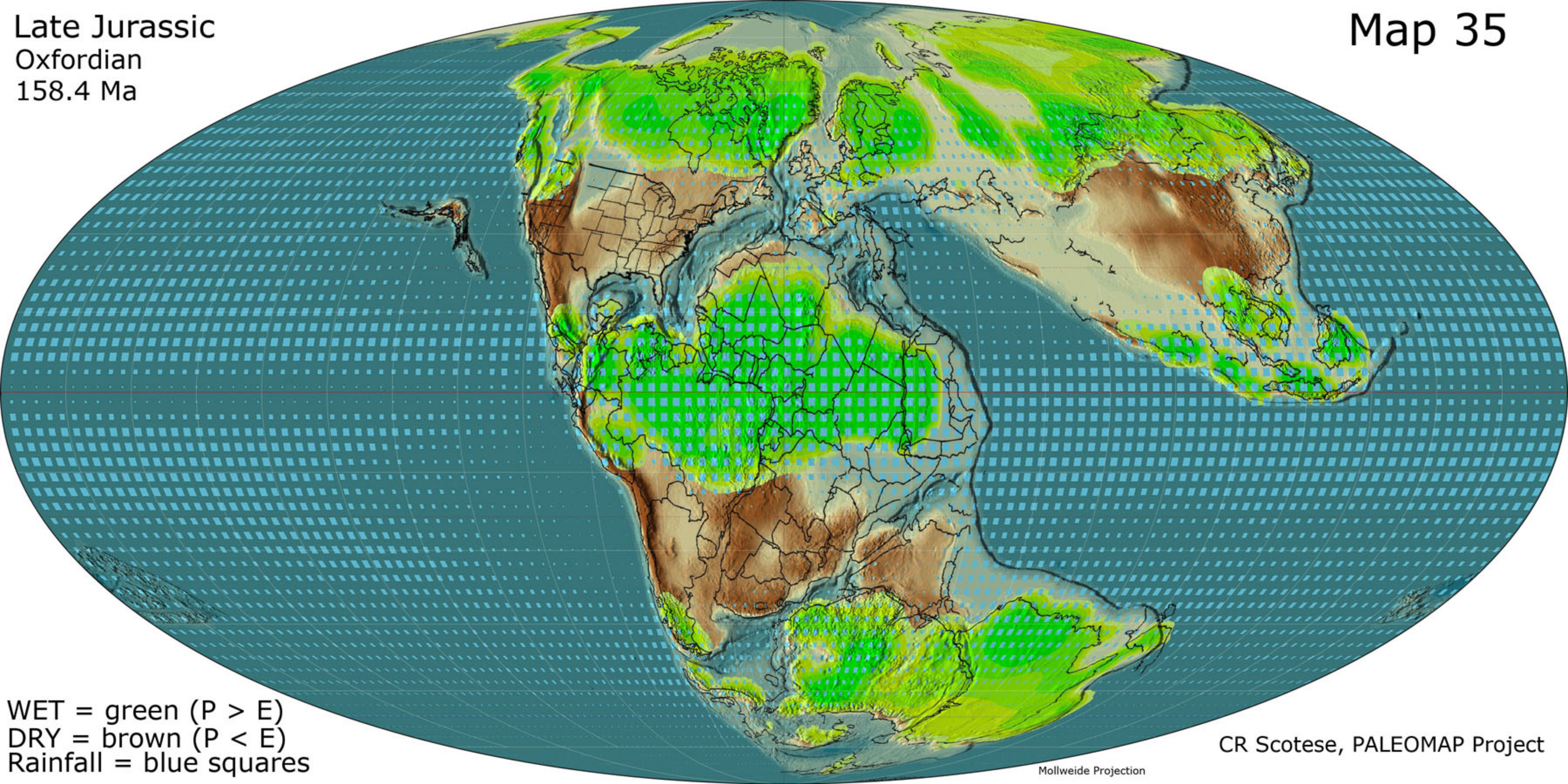


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Late Jurassic  
Oxfordian  
158.4 Ma

Map 35



WET = green ( $P > E$ )  
DRY = brown ( $P < E$ )  
Rainfall = blue squares

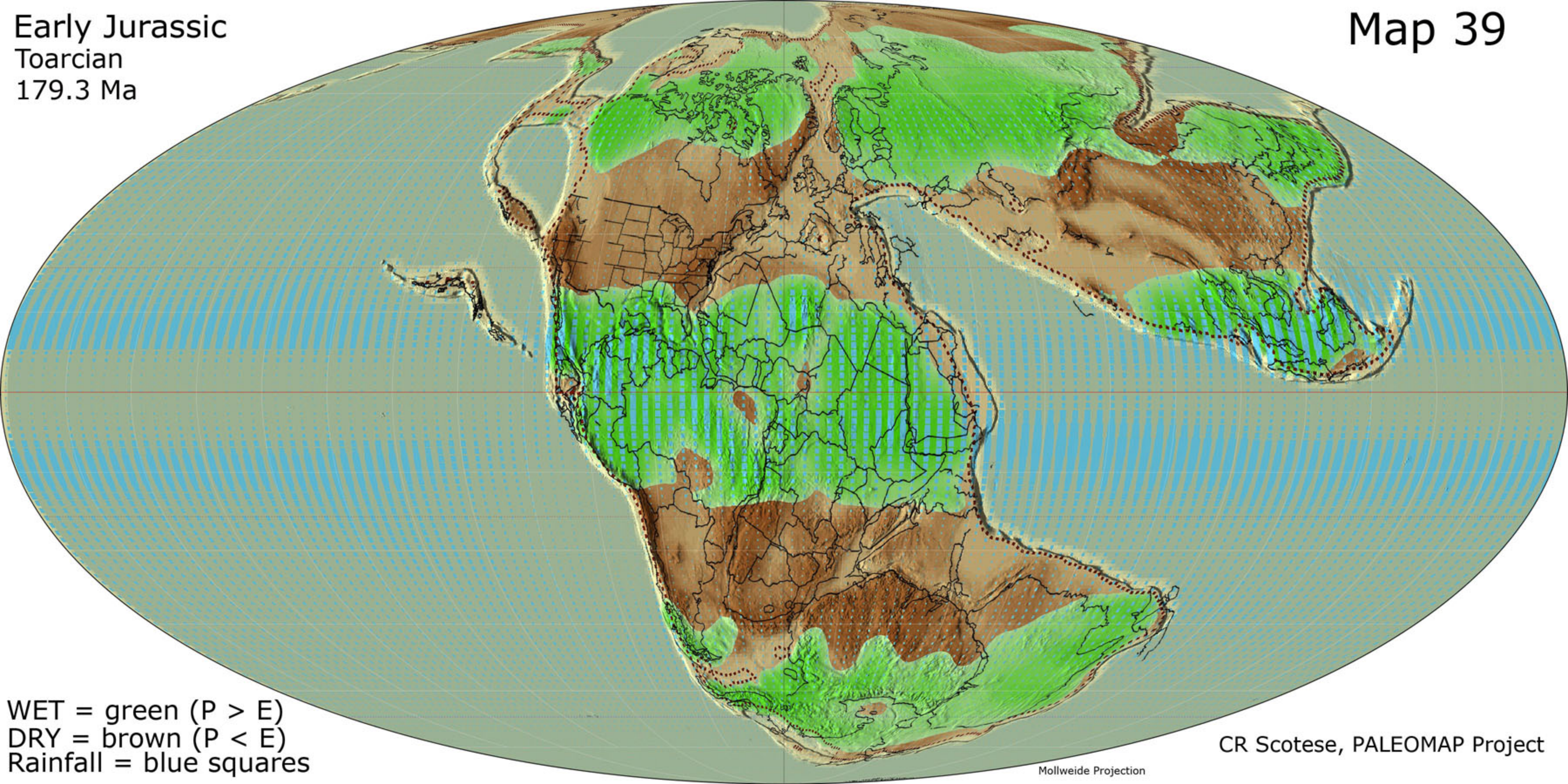
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Early Jurassic  
Toarcian  
179.3 Ma

Map 39



WET = green ( $P > E$ )  
DRY = brown ( $P < E$ )  
Rainfall = blue squares

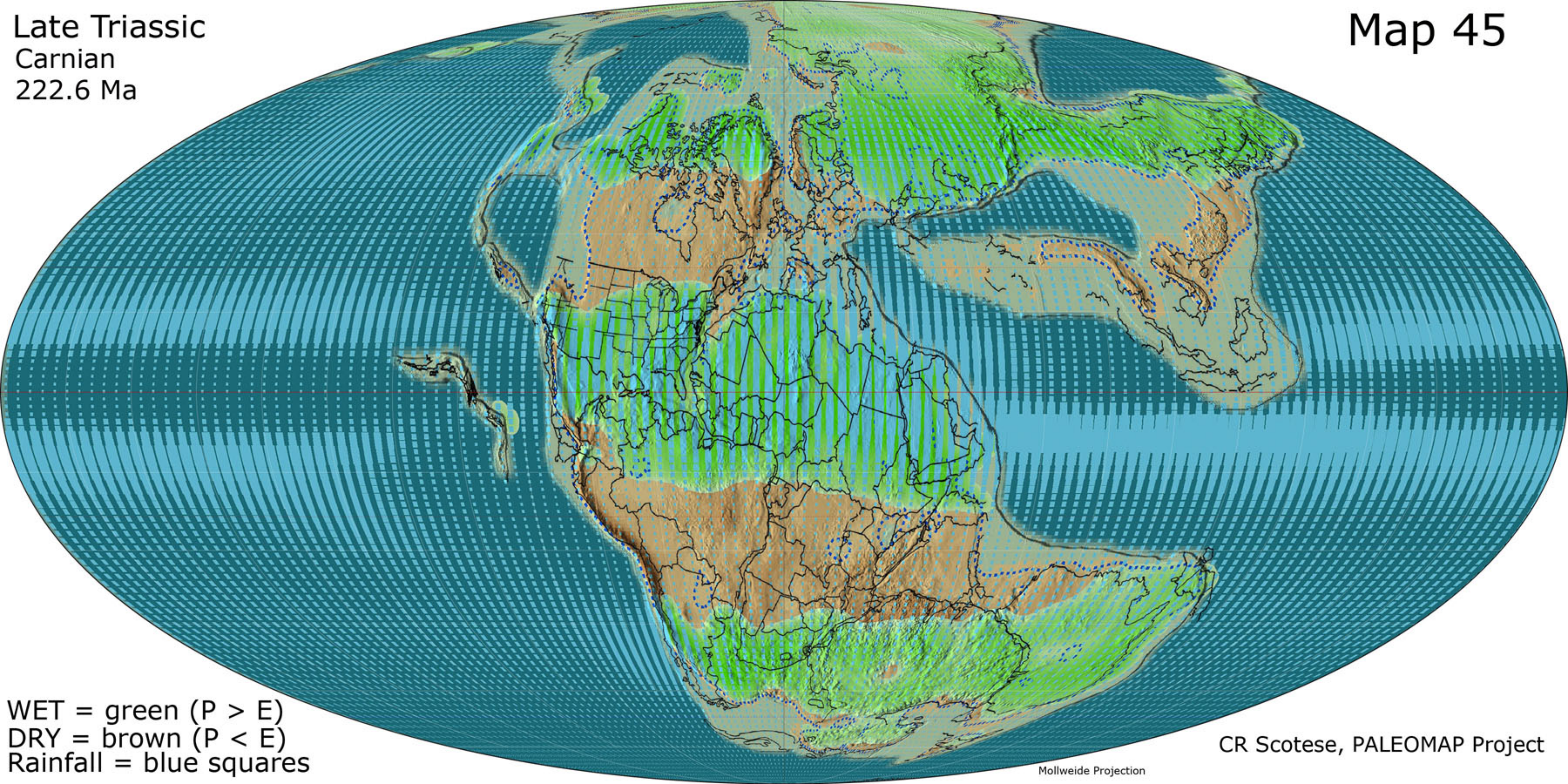
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Late Triassic  
Carnian  
222.6 Ma

Map 45



WET = green ( $P > E$ )  
DRY = brown ( $P < E$ )  
Rainfall = blue squares

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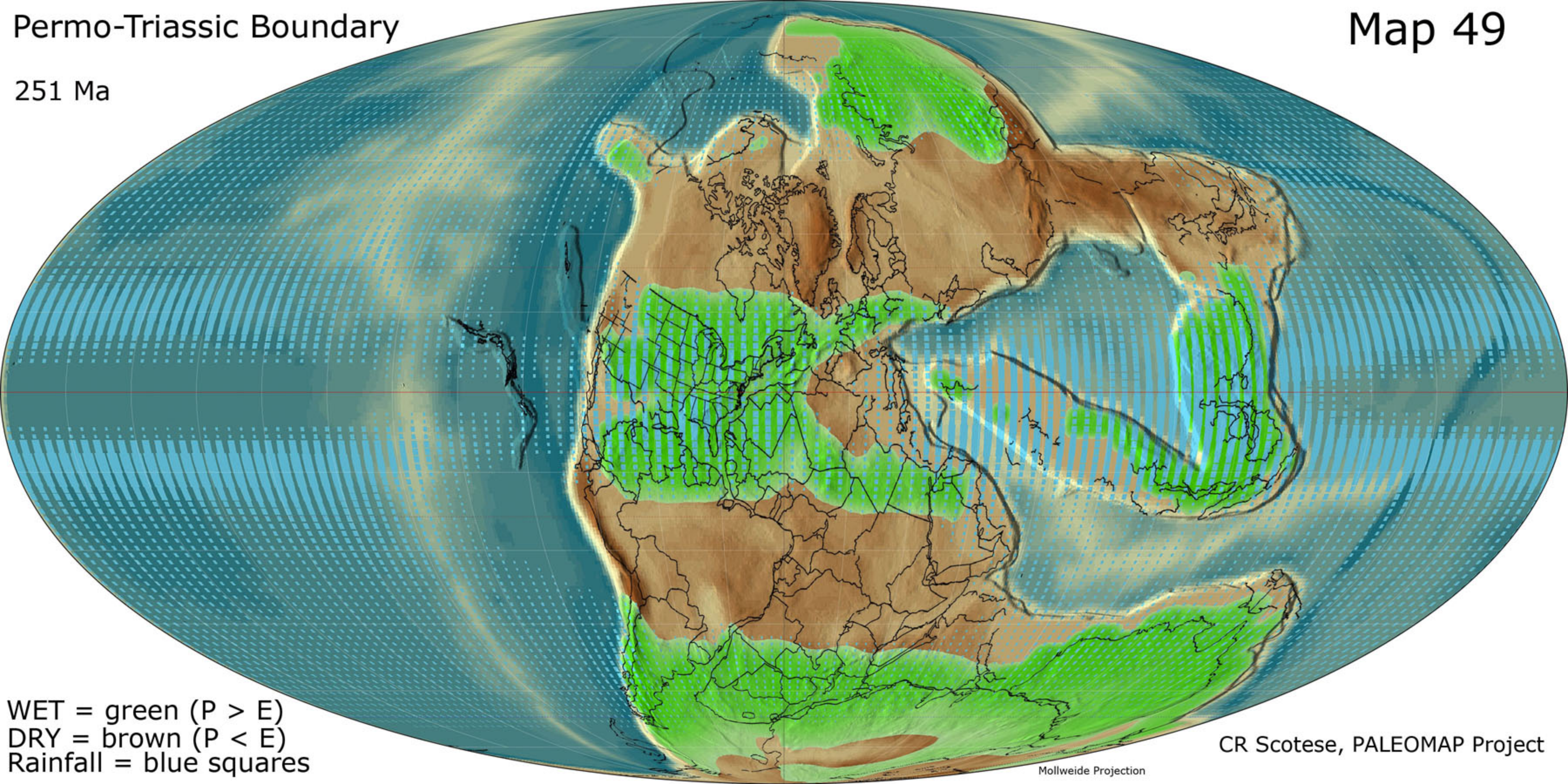
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# Permo-Triassic Boundary

Map 49

251 Ma



WET = green ( $P > E$ )  
DRY = brown ( $P < E$ )  
Rainfall = blue squares

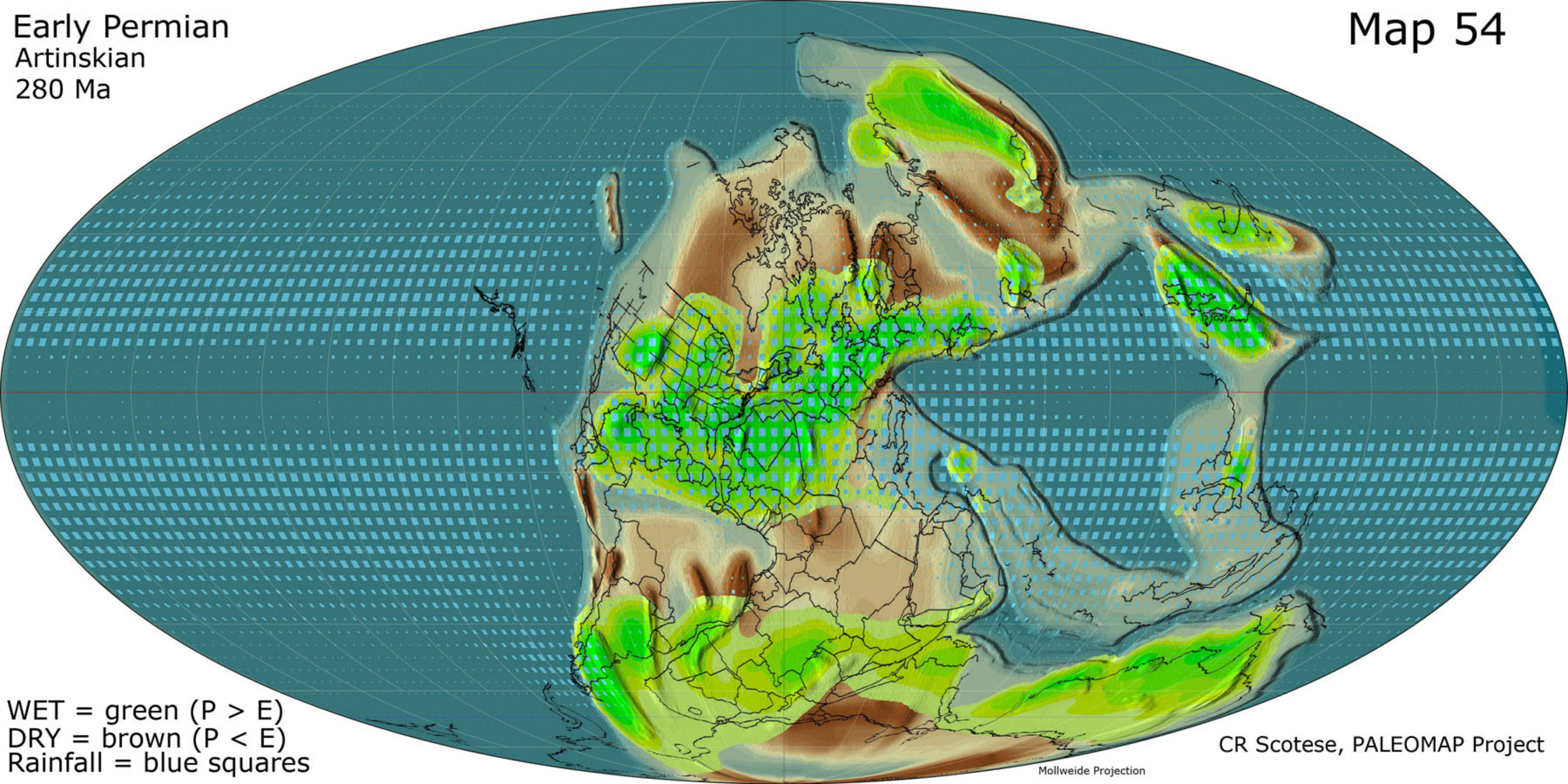
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Early Permian  
Artinskian  
280 Ma

Map 54



WET = green ( $P > E$ )  
DRY = brown ( $P < E$ )  
Rainfall = blue squares

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Late Pennsylvanian  
Gzhelian  
301.2 Ma

Map 57

Map in Preparation

WET = green ( $P > E$ )  
DRY = brown ( $P < E$ )  
Rainfall = blue squares

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Middle Mississippian  
early Viséan  
341.1 Ma

Map 63

Map in Preparation

WET = green ( $P > E$ )  
DRY = brown ( $P < E$ )  
Rainfall = blue squares

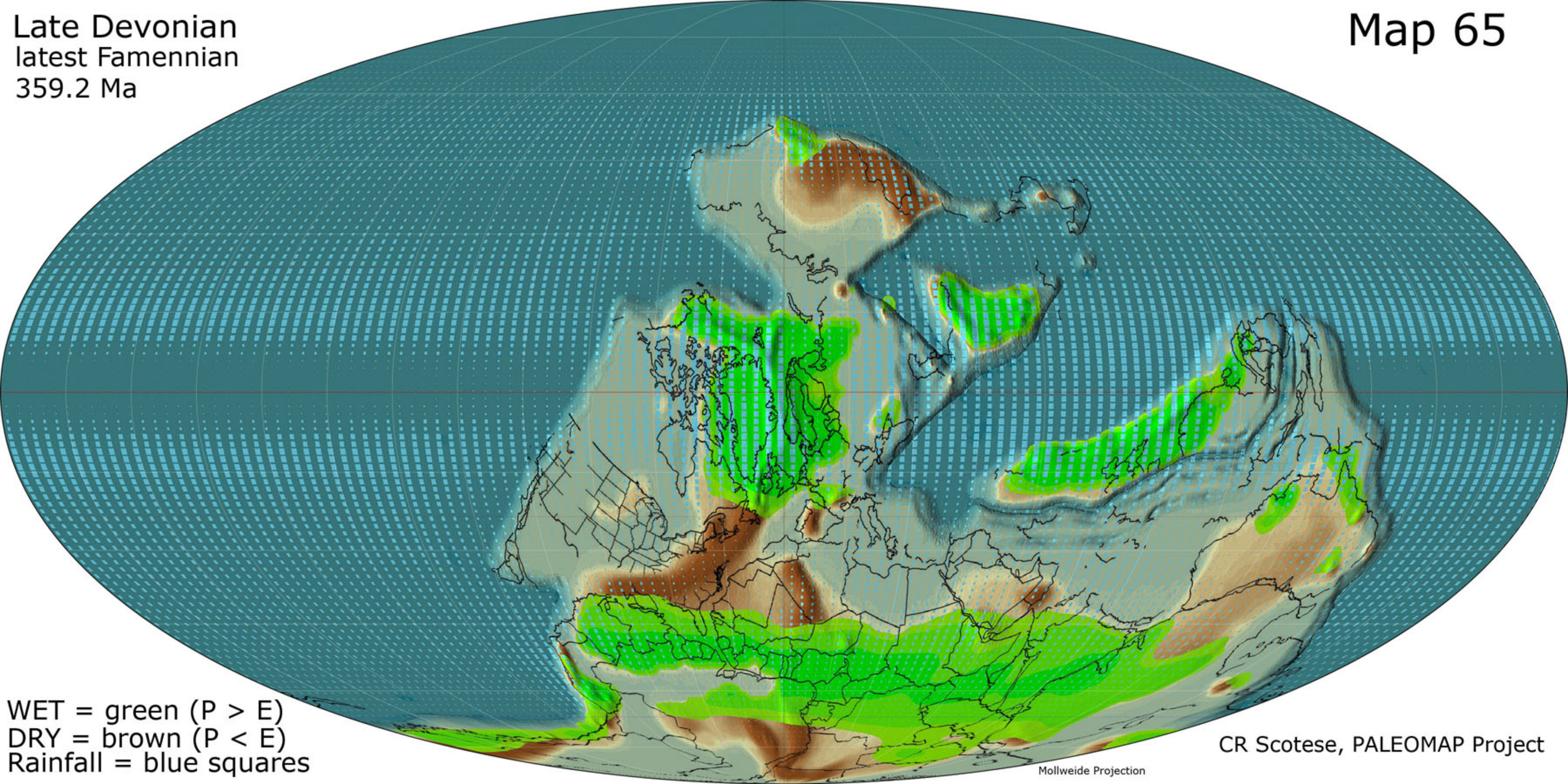
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Late Devonian  
latest Famennian  
359.2 Ma

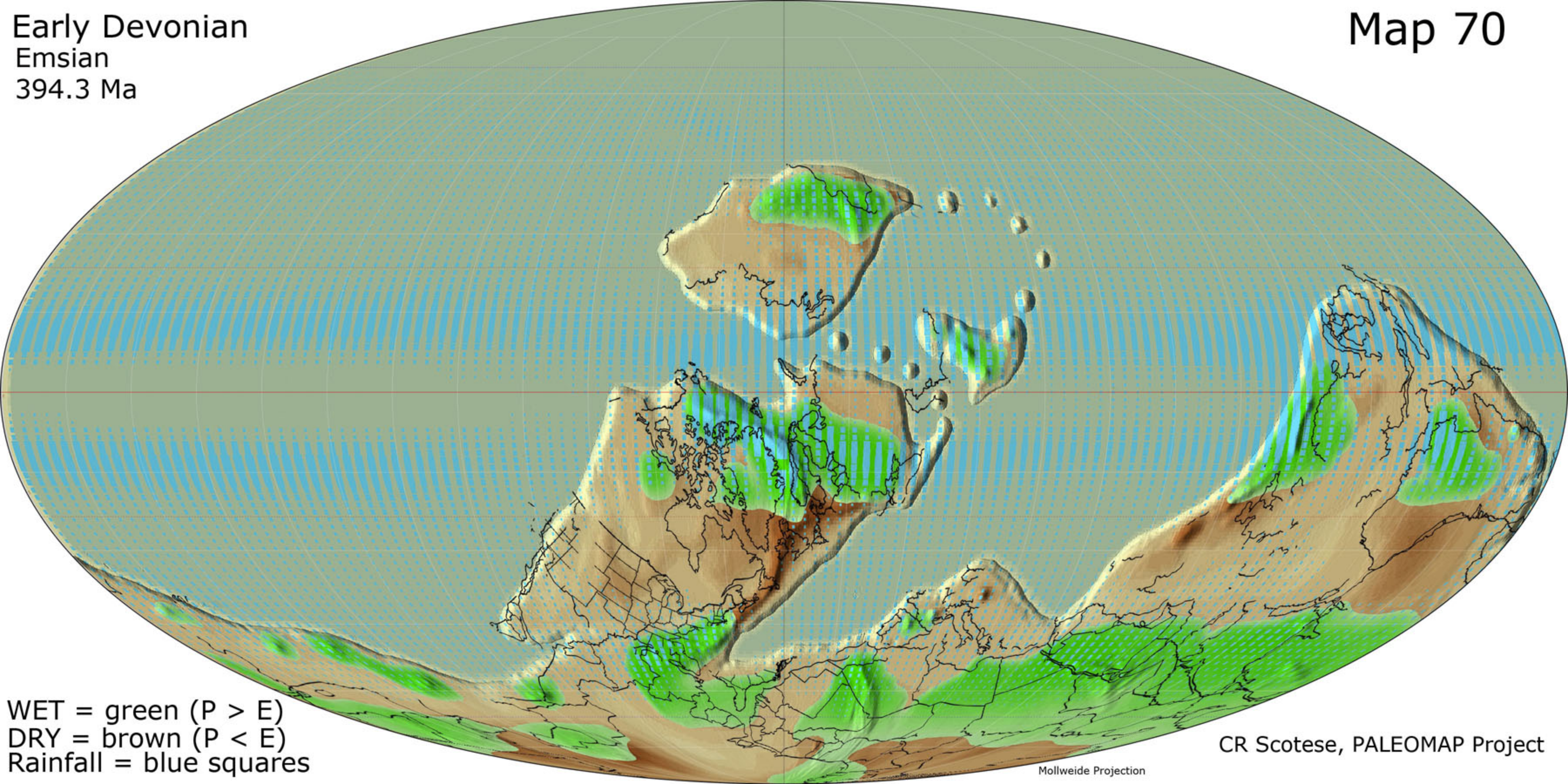
Map 65





Early Devonian  
Emsian  
394.3 Ma

Map 70



WET = green (P > E)  
DRY = brown (P < E)  
Rainfall = blue squares

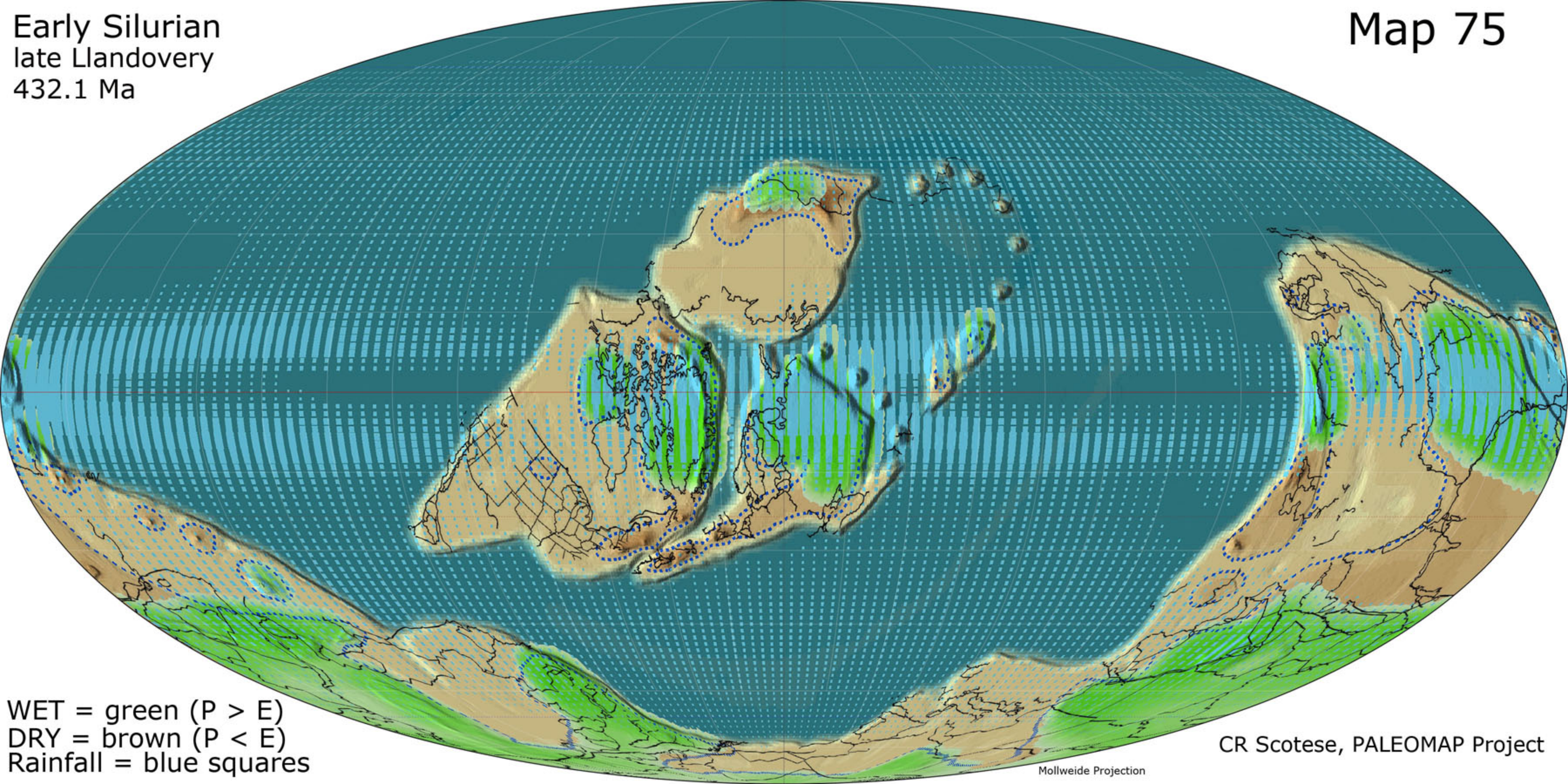
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Early Silurian  
late Llandovery  
432.1 Ma

Map 75



WET = green ( $P > E$ )  
DRY = brown ( $P < E$ )  
Rainfall = blue squares

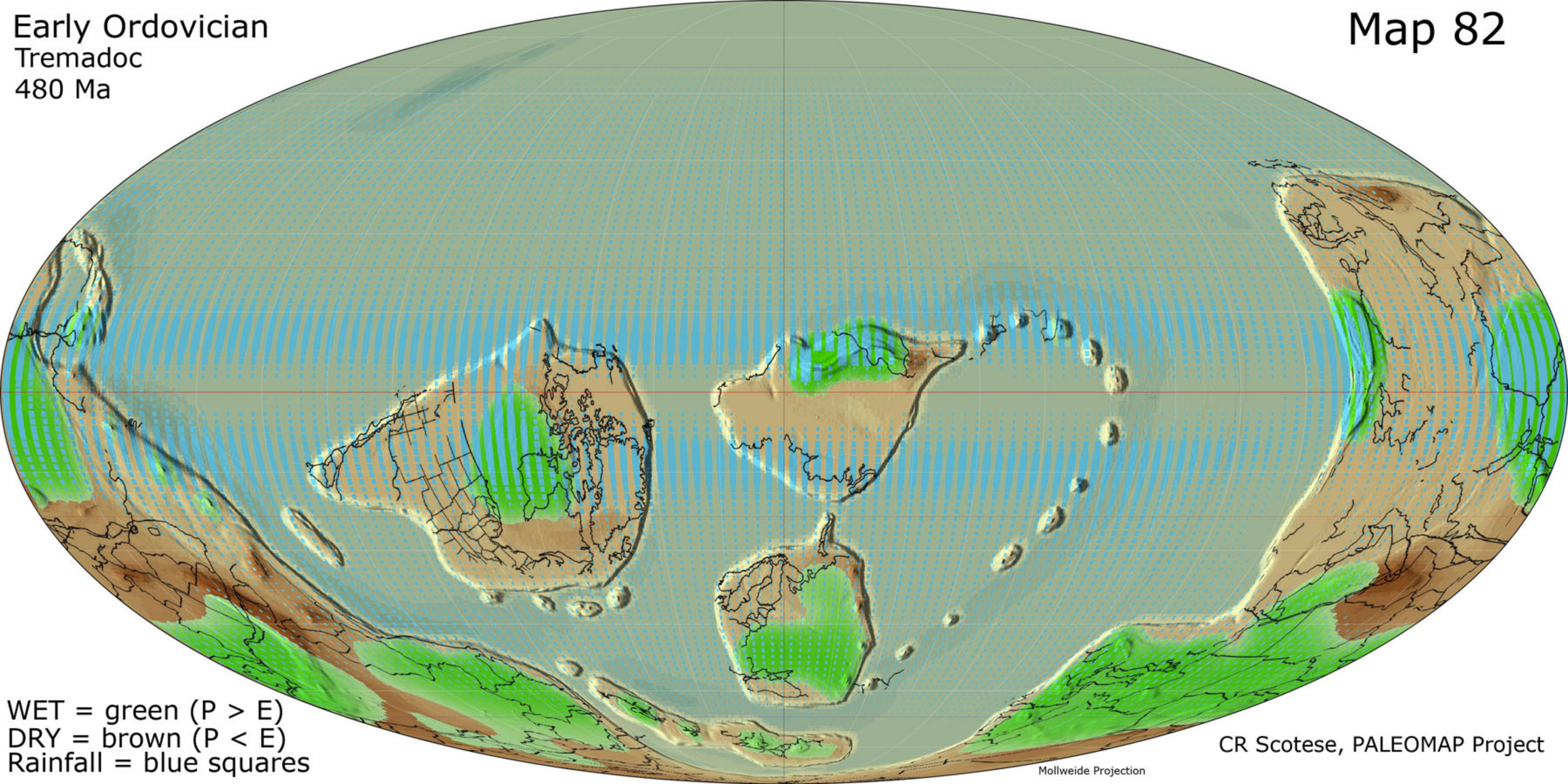
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Early Ordovician  
Tremadoc  
480 Ma

Map 82



WET = green ( $P > E$ )  
DRY = brown ( $P < E$ )  
Rainfall = blue squares

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Cambrian-Precambrian  
Boundary  
542 Ma

Map 88

Map in Preparation

WET = green ( $P > E$ )  
DRY = brown ( $P < E$ )  
Rainfall = blue squares

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Late Neoproterozoic  
Middle Ediacaran  
600 Ma

Map 90

Map in Preparation

WET = green ( $P > E$ )  
DRY = brown ( $P < E$ )  
Rainfall = blue squares

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