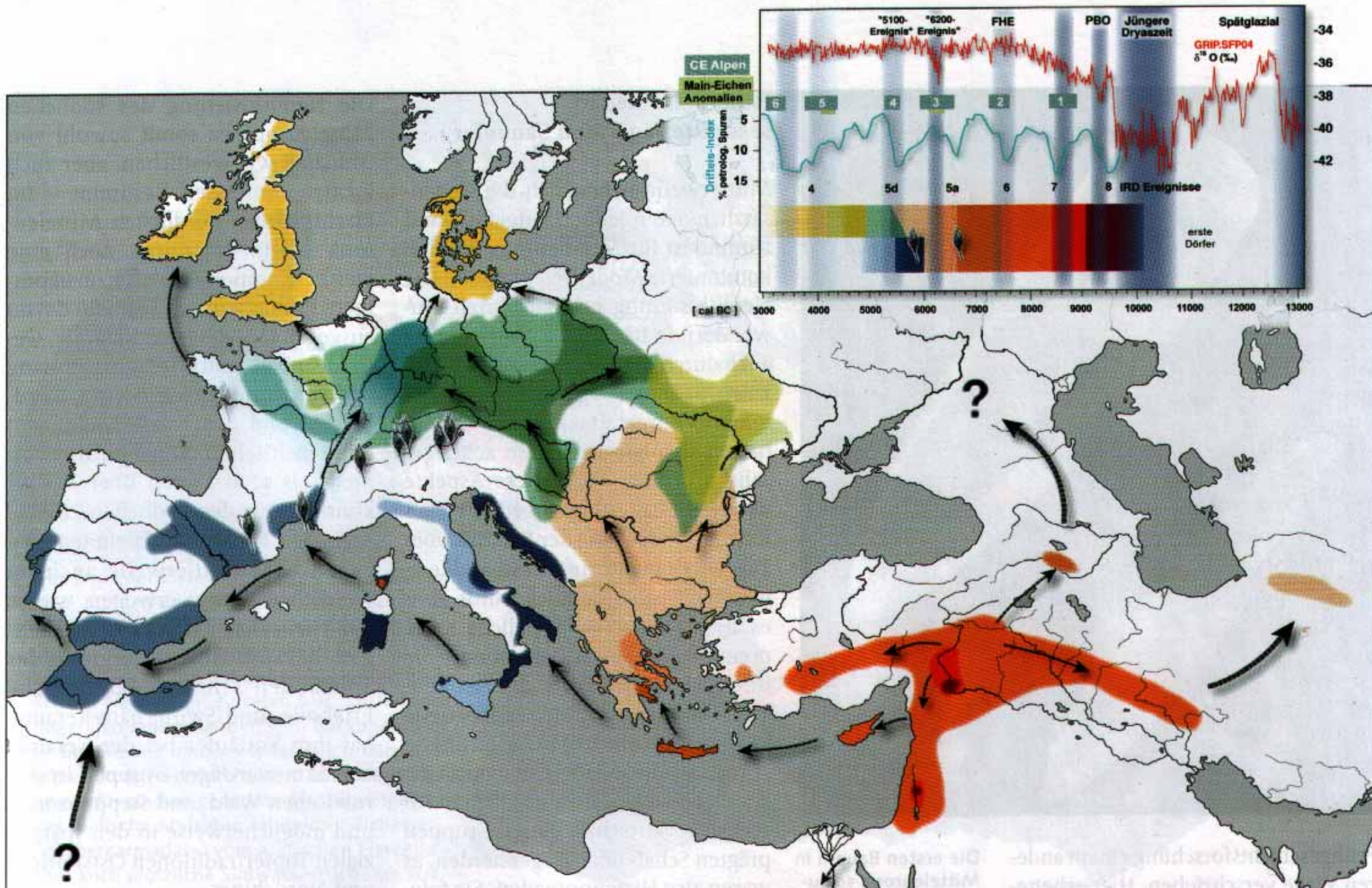


Climate and Human History

Stephan Matthiesen

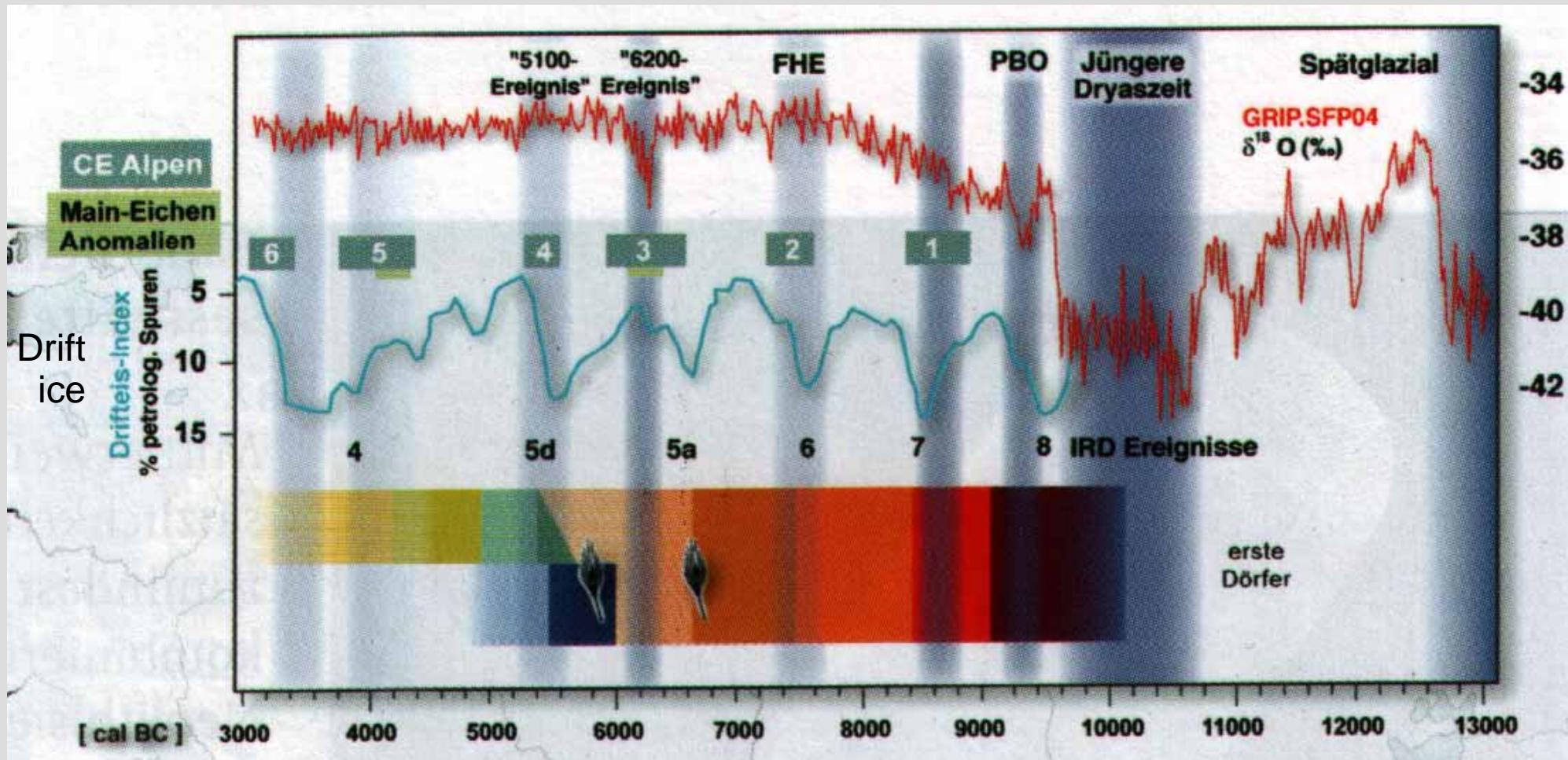
1. Climate and climate history
2. The Ice Age
3. Farming and City States
4. Roman Times
5. Tang and Maya in the 10th century
6. Mediaeval Optimum and Little Ice Age
7. El Niño through the ages
8. Miscellaneous topics
9. Current and future changes
10. Summary and re-cap

Climate and Farming in Europe

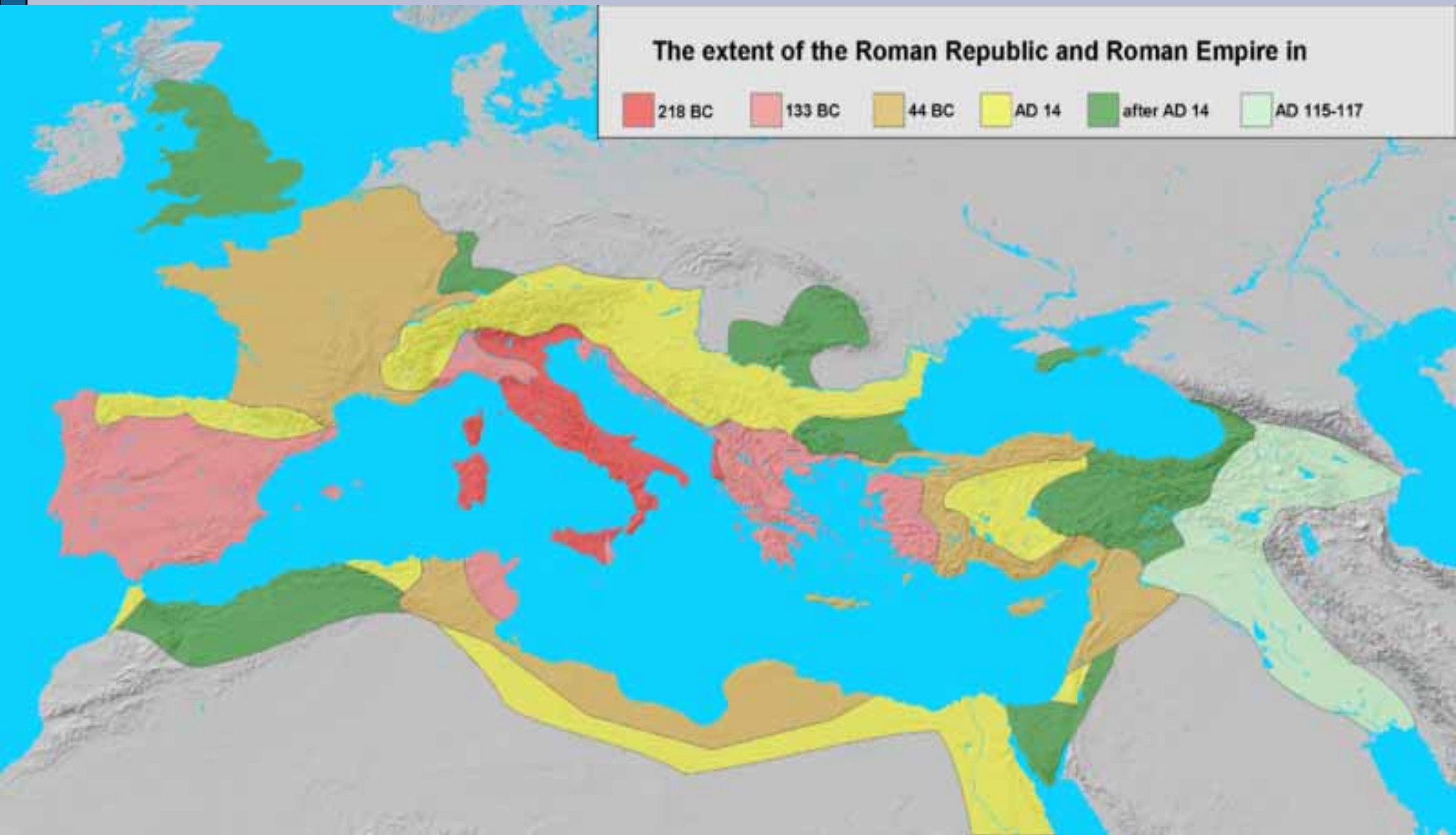


Climate and Farming in Europe

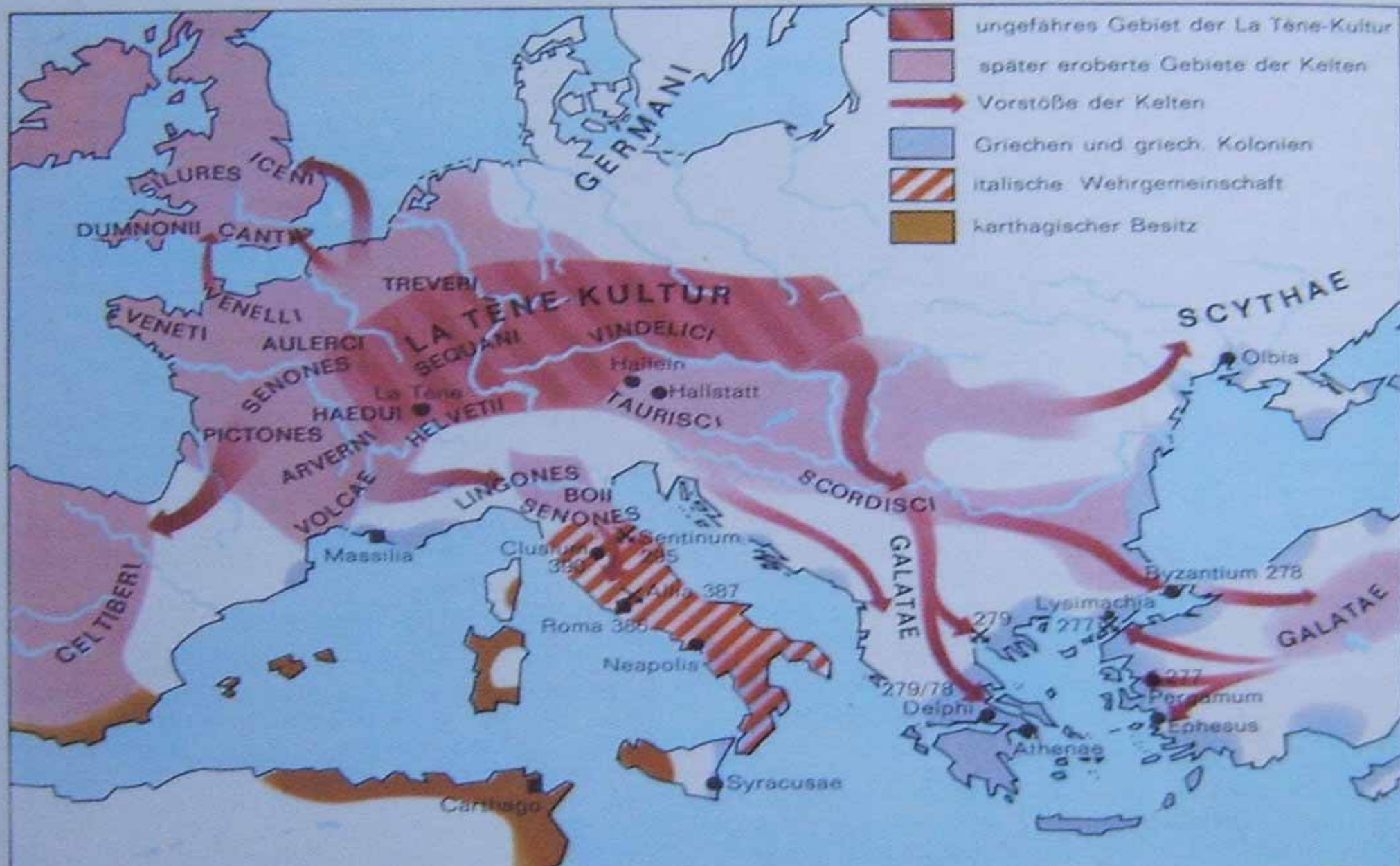
Younger
Dryas



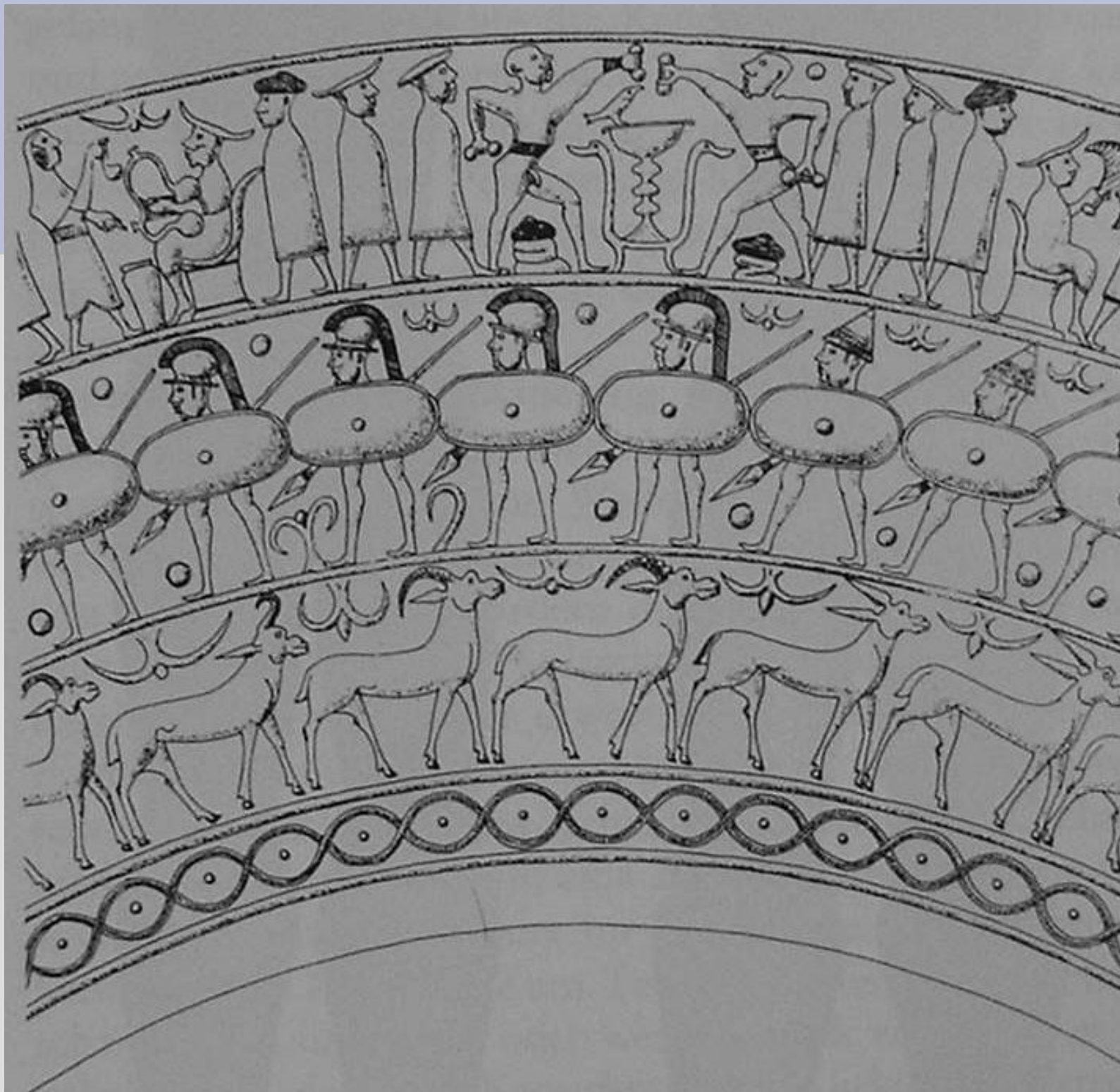
The Roman Empire



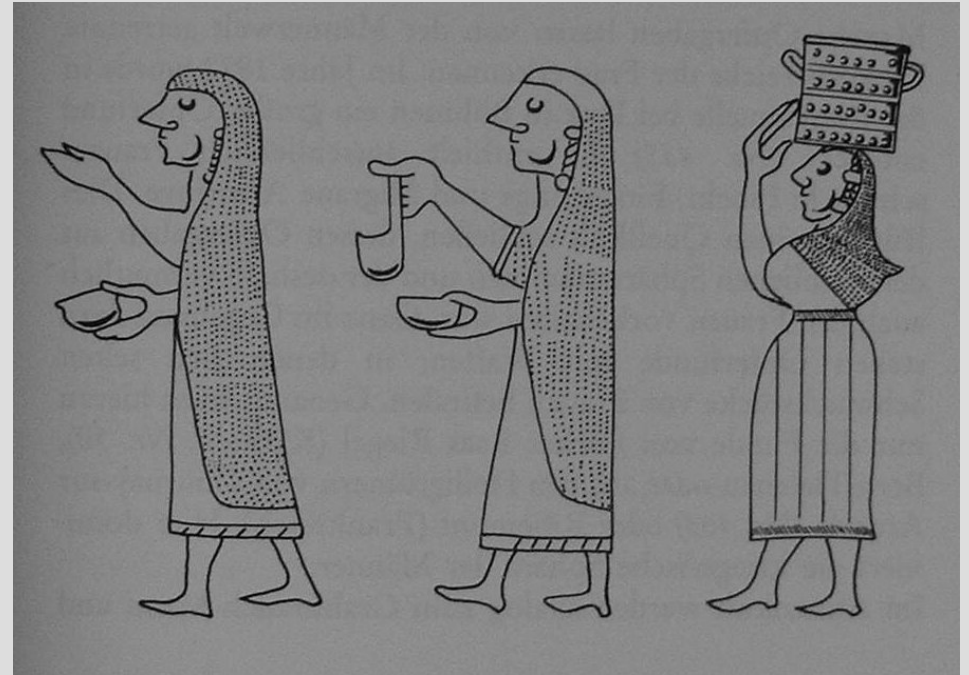
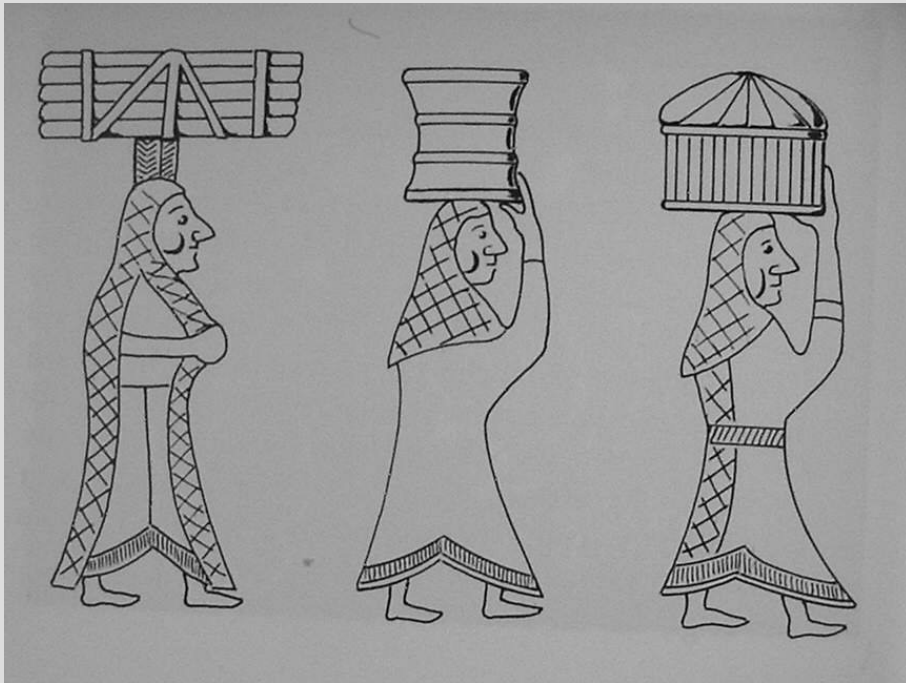
Rome and the Celts



Celts



The Celts



Hochdorf (6th cent. BC)



Chieftain of Hochdorf (6th c. BC)



Chieftain of Hochdorf (6th c. BC)

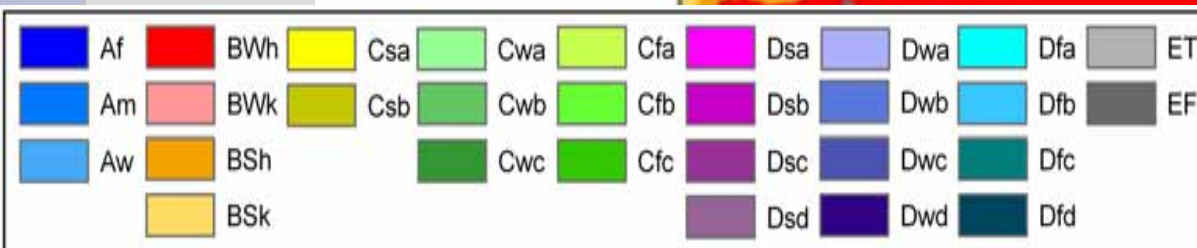


Climate Zones in Europe

Maritime temperate
climates without
dry season(Cfb)

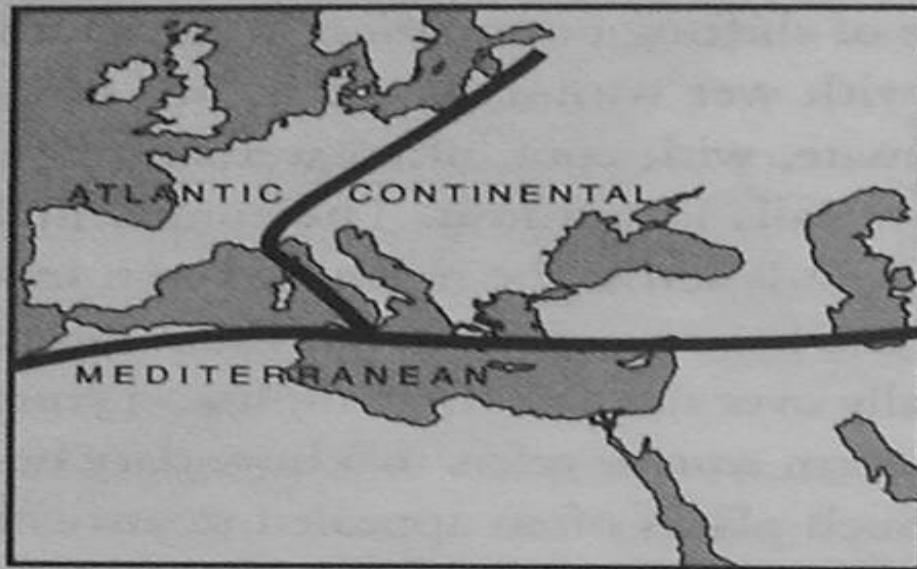
Continental climates (D)
(Dfb: warm summer continental)

Mediterranean climates (Cs)



Peel (2007), Hydrol. Earth Sci. Disc. 4, 439-473
www.hydrol-earth-syst-sci-discuss.net/4/439/2007/

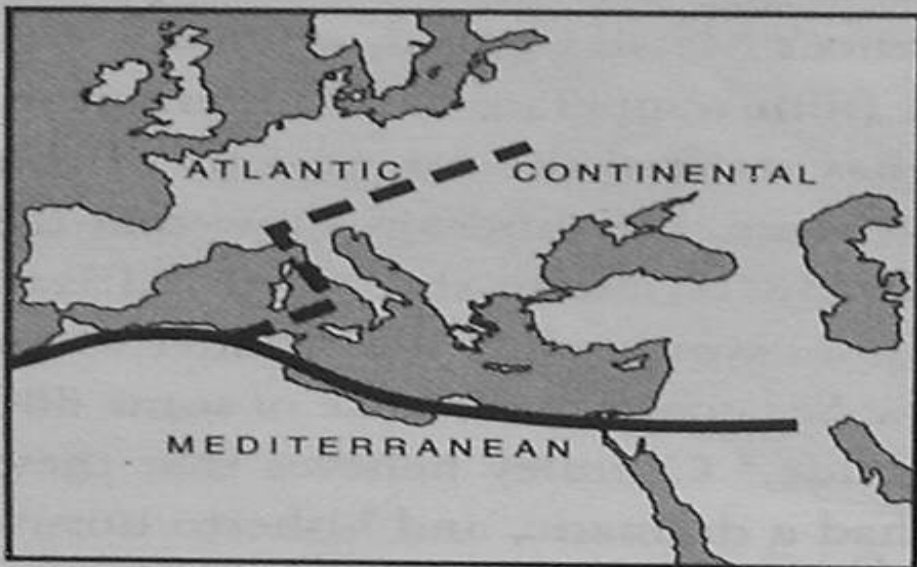
Climate Change 1200BC - 900AD



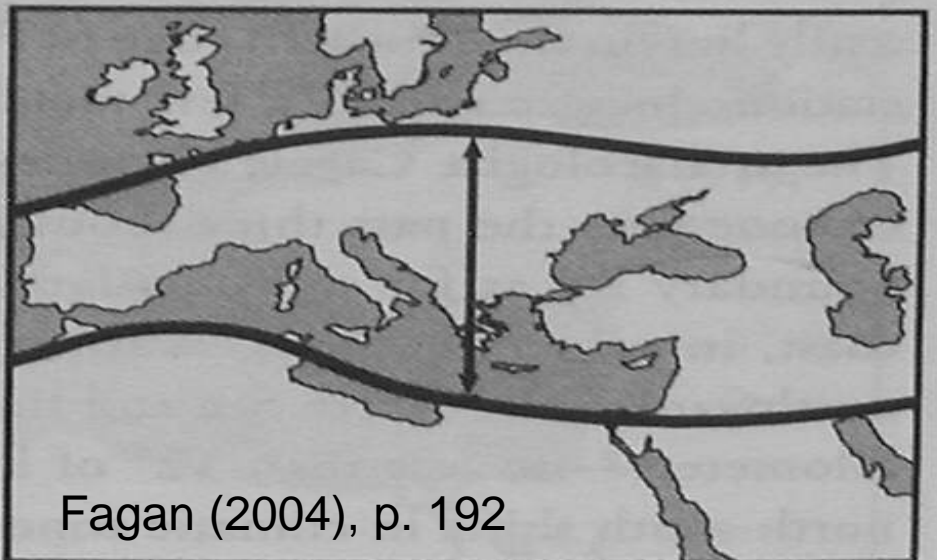
Relative position of air masses,
1200–300 B.C.



Relative position of air masses,
ca. 300 B.C.–A.D. 300



Relative position of air masses,
A.D. 500–900



Fagan (2004), p. 192

Late Holocene range of the Temperate-
Mediterranean ecotone

Holocene climatic change and past Irish societal response

Turney et al. (2006), Journal of Archaeological Science 33, p. 34-38

“The extent to which North Atlantic Holocene climatic perturbations influenced past human societies is an **area of considerable uncertainty and fierce debate**

...

Irish bog and lake tree populations provide unambiguous evidence of major shifts in surface moisture through the Holocene ...

To test for human response to these cycles we summed the probabilities of 465 radiocarbon ages obtained from Irish archaeological contexts ...”

bog pines
grow below
current water
levels

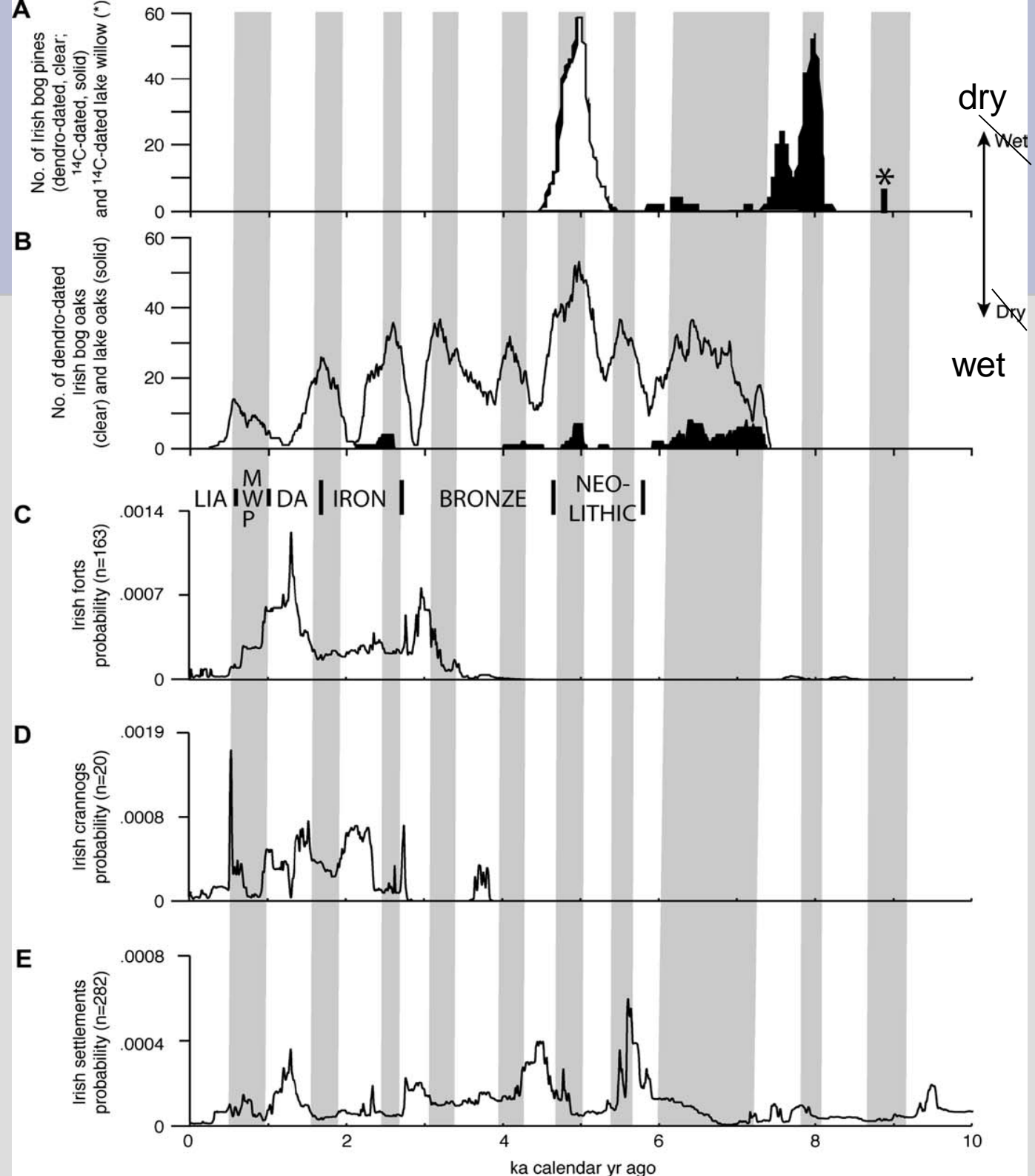
bog oaks

forts

crannogs

settlements

Grey zonation denotes
inferred **dry** phases in Ireland.



Holocene climatic change and past Irish societal response

“These results suggest either increasing density of human populations in **key, often defensive locations**, and/or the development of **subsistence strategies** to overcome changing conditions, the latter recently proposed as a significant factor in avoiding societal collapse.

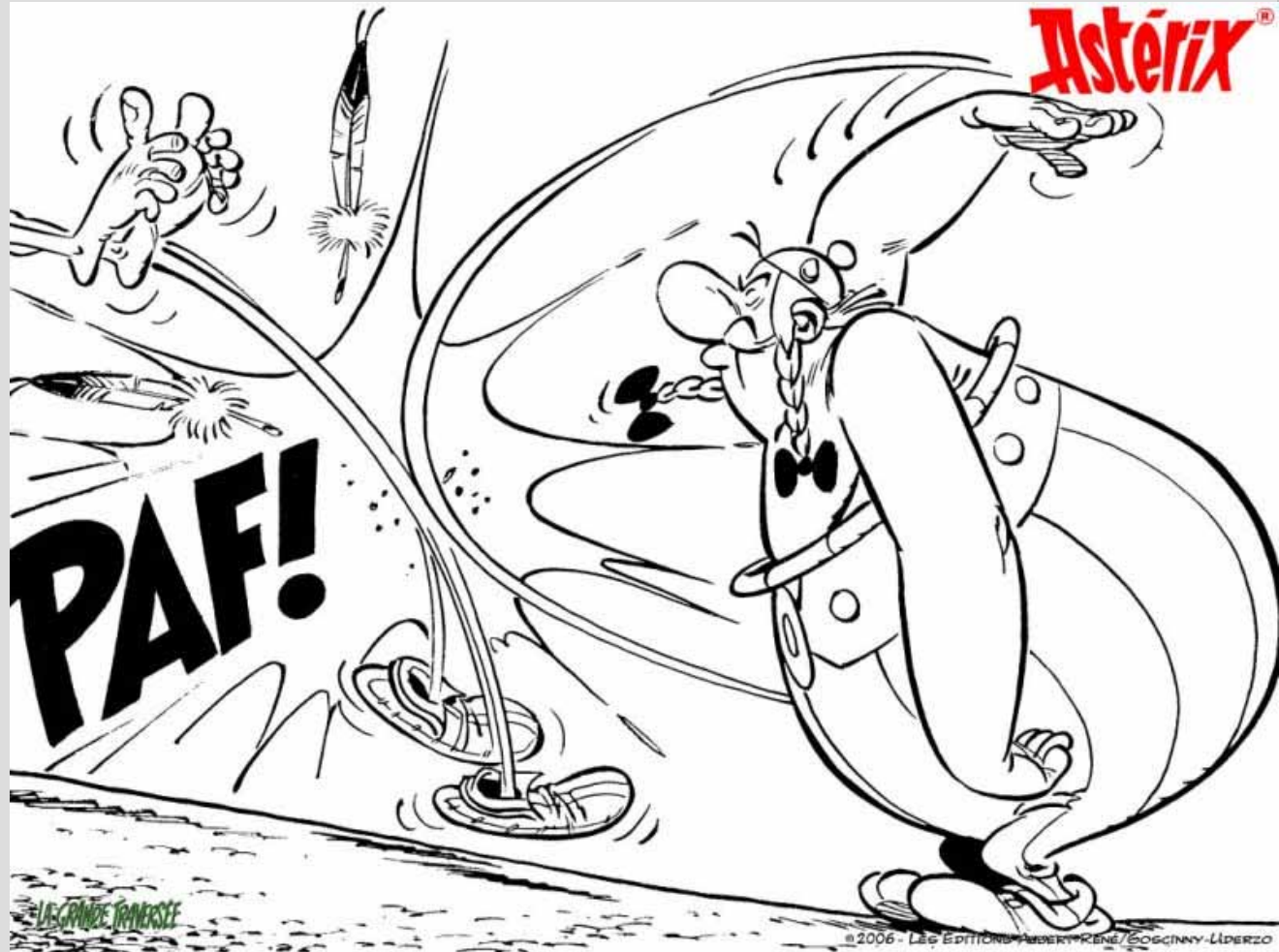
Regardless, we demonstrate environmental change is a significantly more important factor in influencing human activity in the landscape than has hitherto been acknowledged.”

Celts in the 1st Millennium AD

- Agricultural resources stretched to the limit
- Warrior society

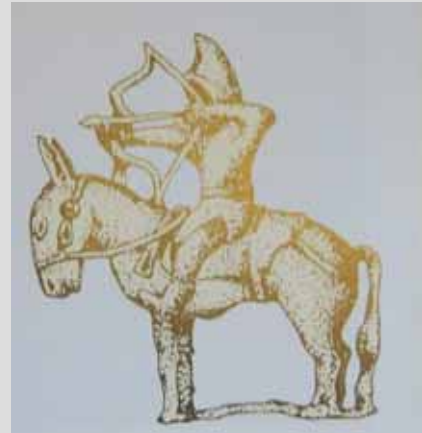
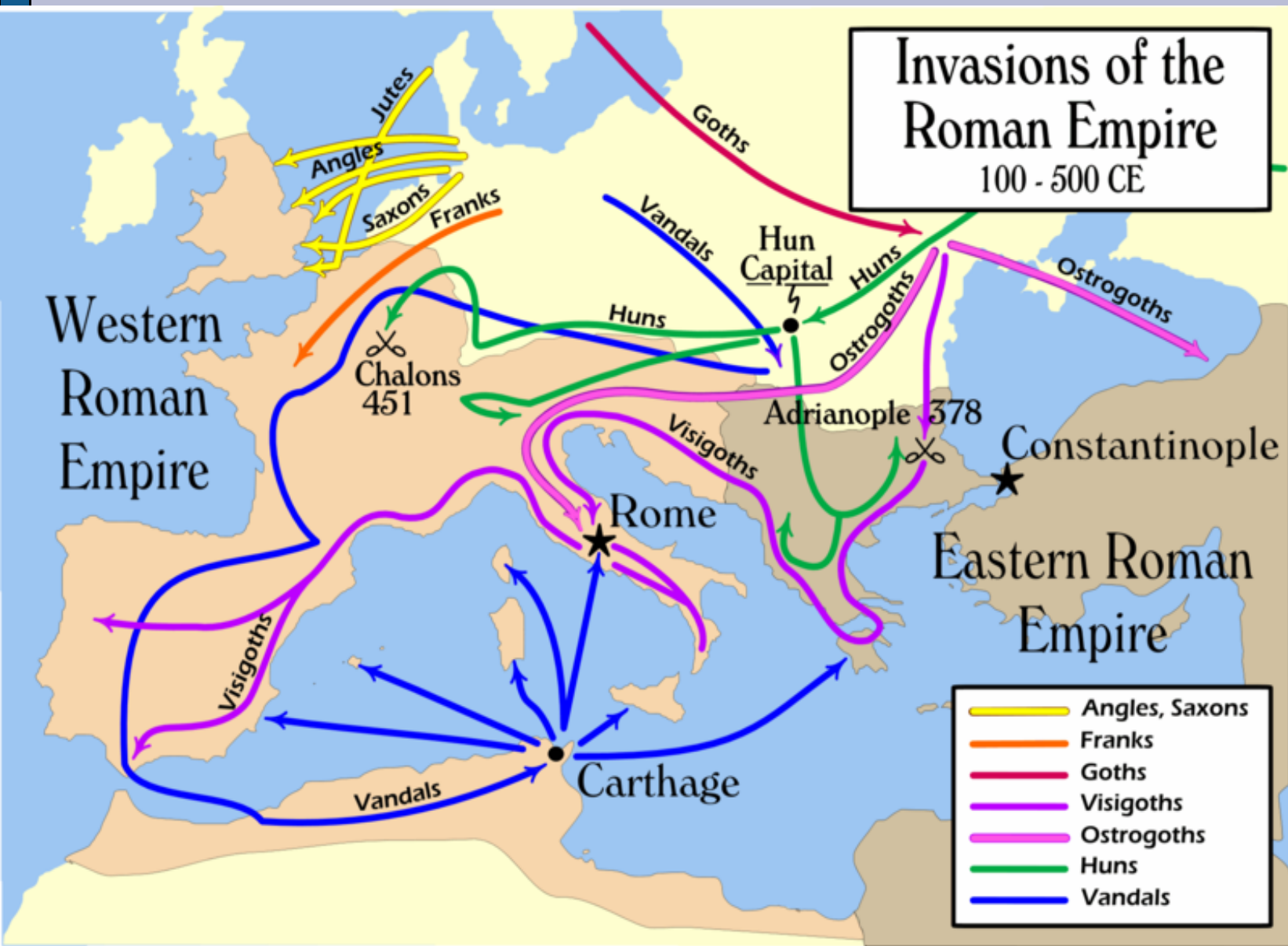
The Celts

“The whole race
is madly fond of
war, high-
spirited, and
quick to battle.”
(Strabo, 1st
century BC)



“Barbarian Invasions”

“Völkerwanderung” (“Migration”)



Bronze, Mongolia

The Huns

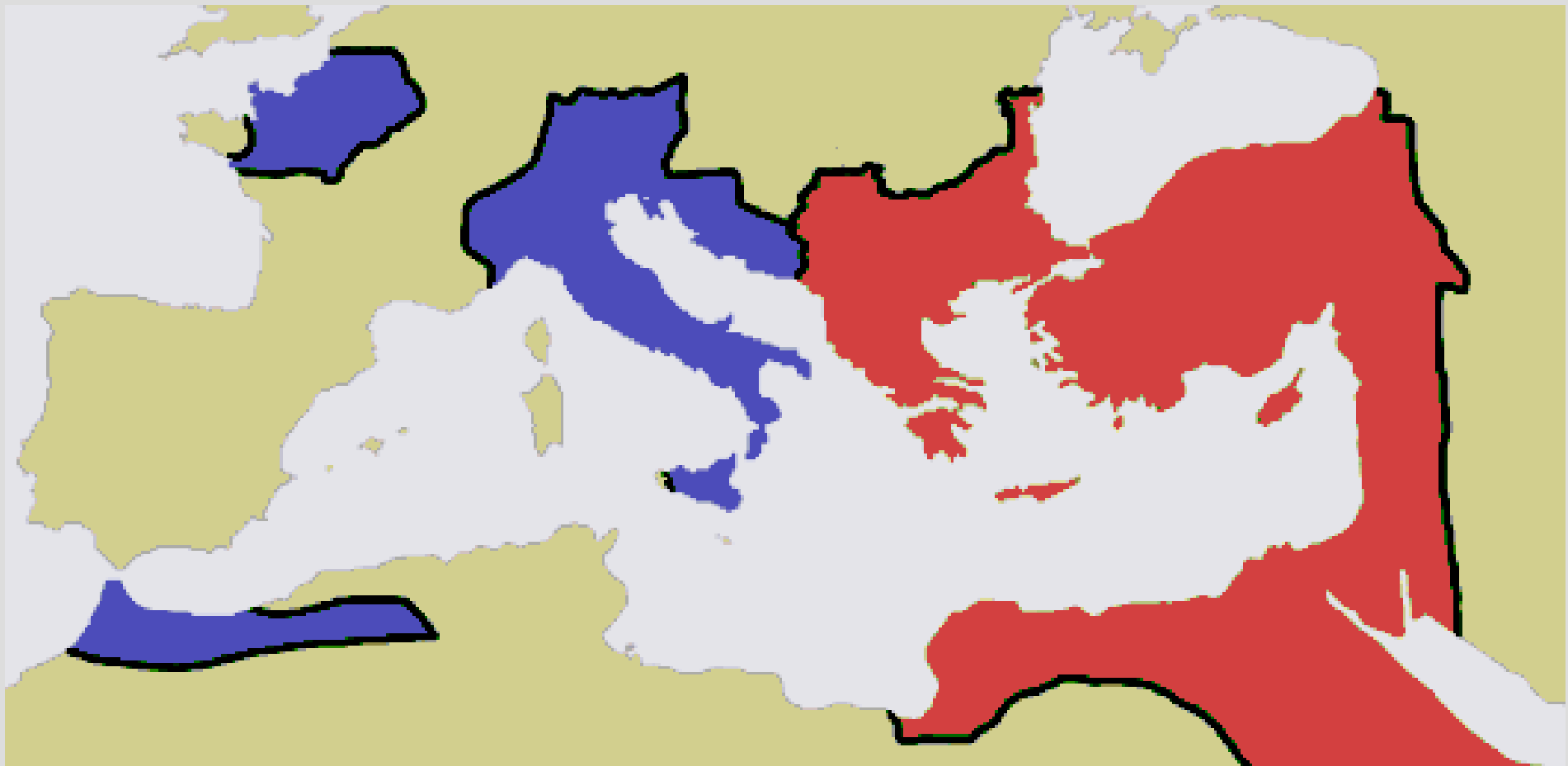


Bronze, Mongolia

Women headdress(diadem)
from Csorna, Hungary



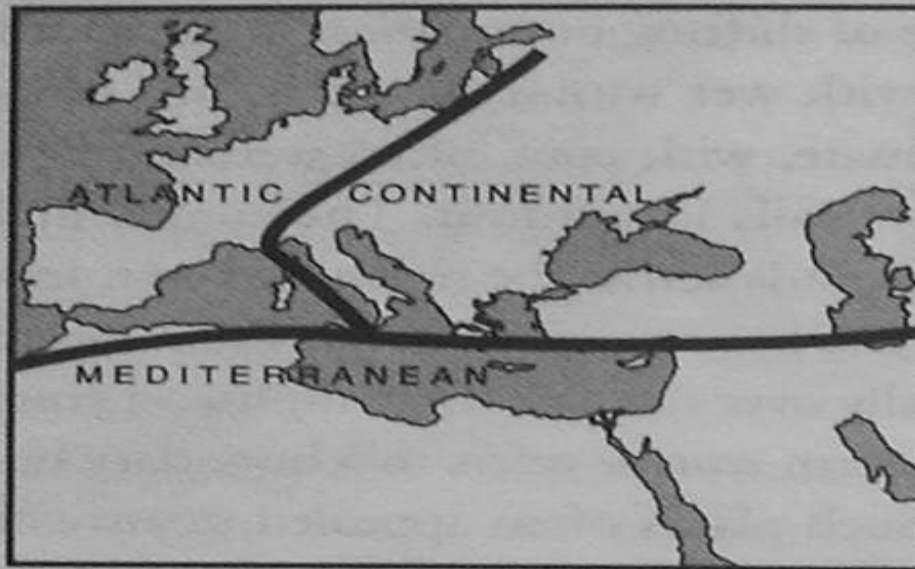
The Roman Empire AD 476



Europe AD 486



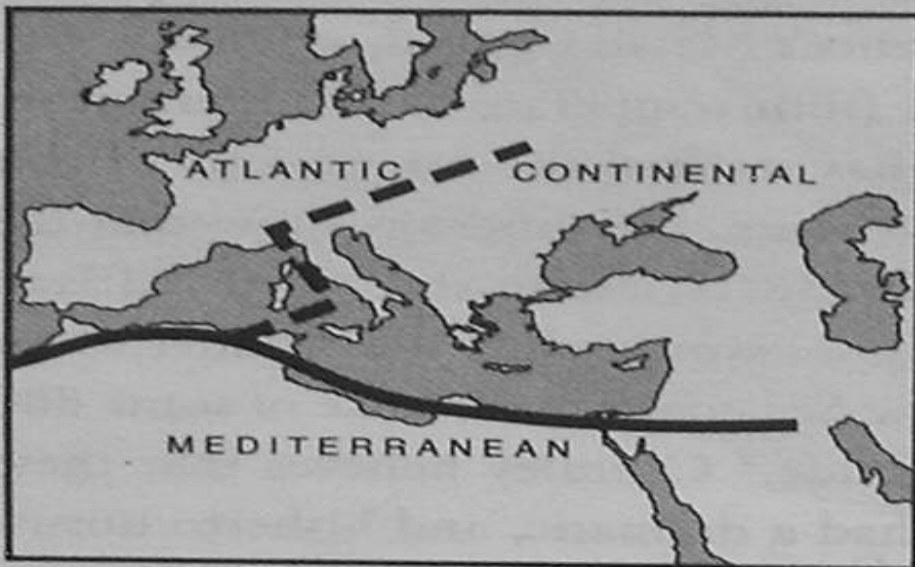
Climate Change 1200BC - 900AD



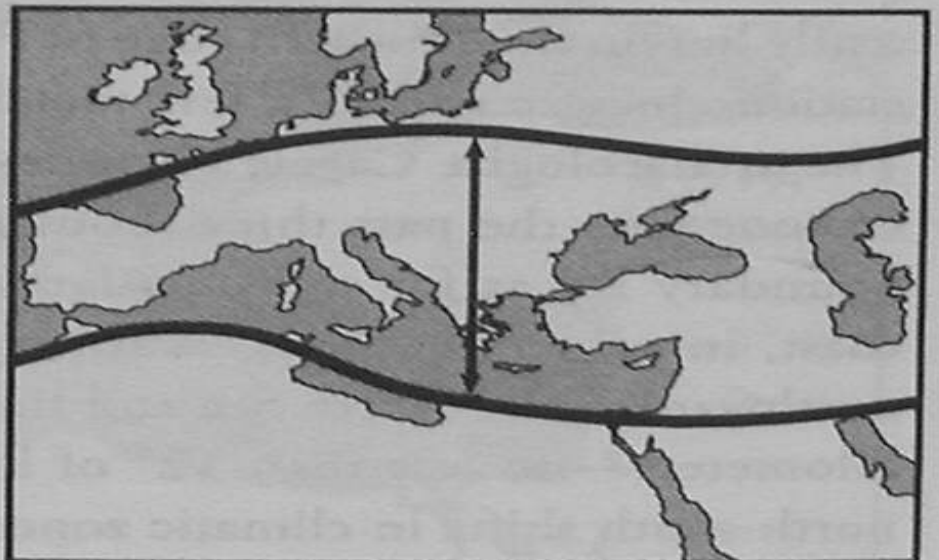
Relative position of air masses,
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Relative position of air masses,
ca. 300 B.C.–A.D. 300



Relative position of air masses,
A.D. 500–900



Late Holocene range of the Temperate-
Mediterranean ecotone

The Fall/D Decline of the Roman Empire

- The influx of Germanic mercenaries affected the discipline and loyalty of the military (Vegetius, 4th cent.)
- “[T]he decline of Rome was the natural and inevitable effect of immoderate greatness. Prosperity ripened the principle of decay; the causes of destruction multiplied with the extent of conquest; and as soon as time or accident had removed the artificial supports, the stupendous fabric yielded to the pressure of its own weight,” (Edward Gibbon, 1737-94)

The Fall/Decline of the Roman Empire – external factors

- Climate changes?
- Pressure from the migrating peoples
- Invention of horseshoe (ca AD 200) gave military advantage
- Antonine plague (since 165 AD) and other epidemics

The Fall/D Decline of the Roman Empire – internal factors

- The Empire was too large and complex to coordinate efficiently – roots of feudalism developed
- Institutions developed during Republican times no longer appropriate
- No budgetary system, economy largely based on plundering or taxes
- Free trade system in the 1st&2nd cent. but uneconomic price laws later

The Fall/D Decline of the Roman Empire

Or was there no “fall”, but simply a transformation of the existing institutions?



Bishop's church, Kaiseraugst, Burgundy, ca 470

Literature

- Fagan (2004): The Long Summer
- Die Völkerwanderung. Archäologie in Deutschland Sonderheft 2005.