

Quaternary Engineering Geology of London *and* The London Basin Forum

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THE GEOLOGICAL SOCIETY
ENGINEERING GROUP FORUM
ROYAL GEOGRAPHICAL SOCIETY
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Outline

- Context for Engineering Geology in London
- Relevance of the Quaternary
- Development of the Thames valley
- Character of Thames deposits/soils
- Post-depositional modification
- Issues
- Role of the *London Basin Forum*

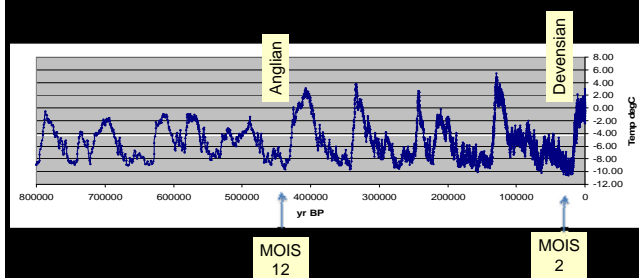
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Context

- Eurocode 7; BS En ISO 14688; BS EN ISO 14689
 - Need for “broad knowledge” (Peter Scott 2011)
 - Planning Policy Statements
 - Environment Protection Act
 - Health & Safety Risk Management / CDM
 - Sustainability
- Need for reliable Ground Models**

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Quaternary climates



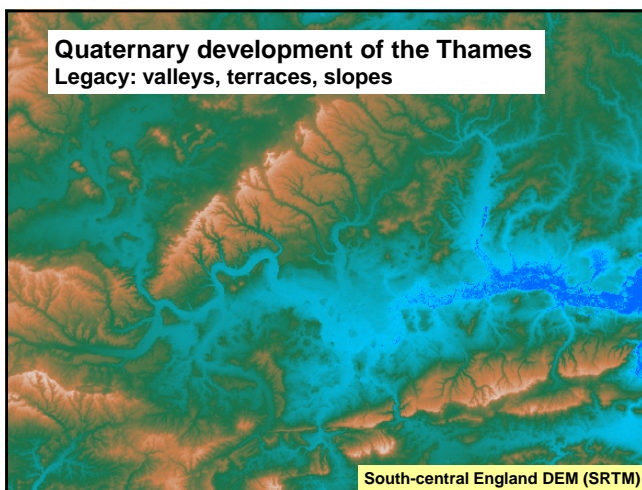
Composite temperature record from Antarctica.
(data from Jouzel *et al.* 2007; Siegenthaler *et al.* 2008)

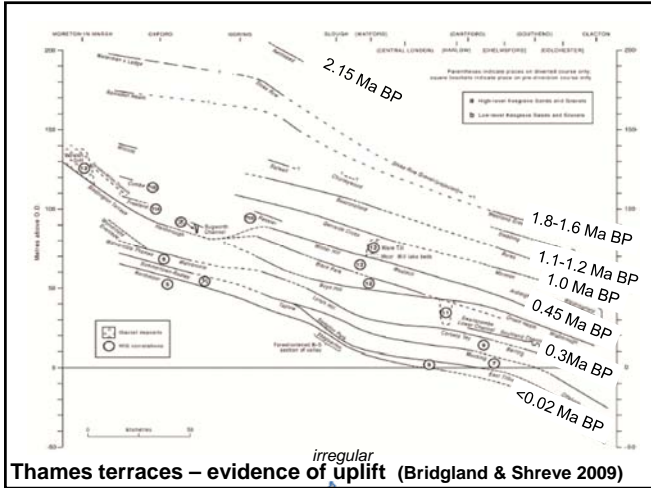
Relevance of the Quaternary

- Control on soil/sediment distribution
- Control on surface form
- Influence on ground behaviour
 - Relict shear surfaces
 - Over-consolidation
 - Pedogenesis
- Influence on drainage
- Hazards

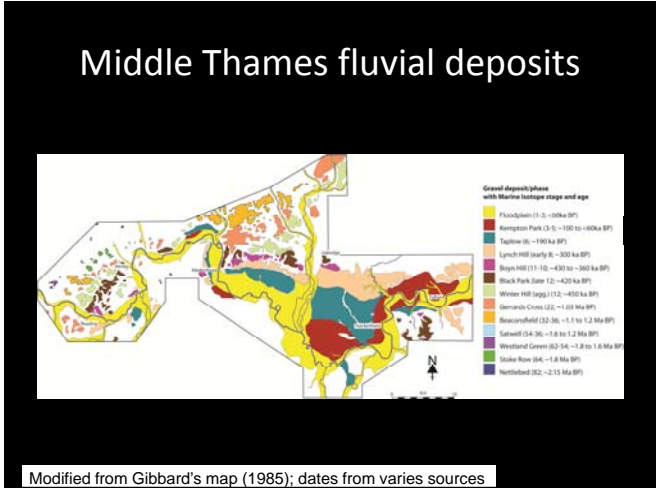
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Quaternary development of the Thames Legacy: valleys, terraces, slopes

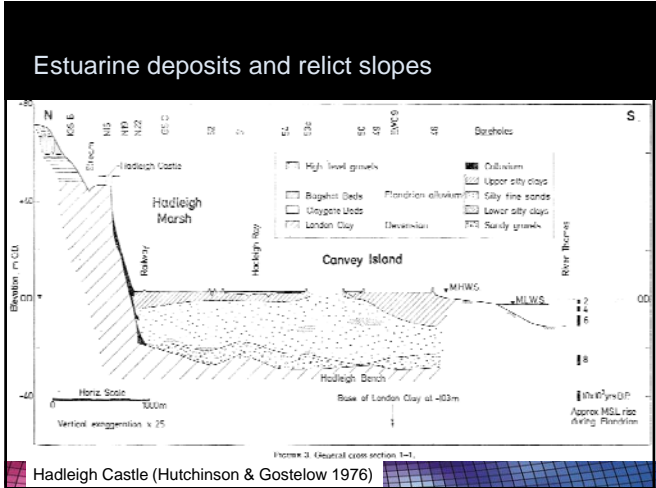




Thames terraces – evidence of ^{irregular} uplift (Bridgland & Shreve 2009)





Modified from Gibbard's map (1985); dates from various sources



Characteristics of Thames deposits

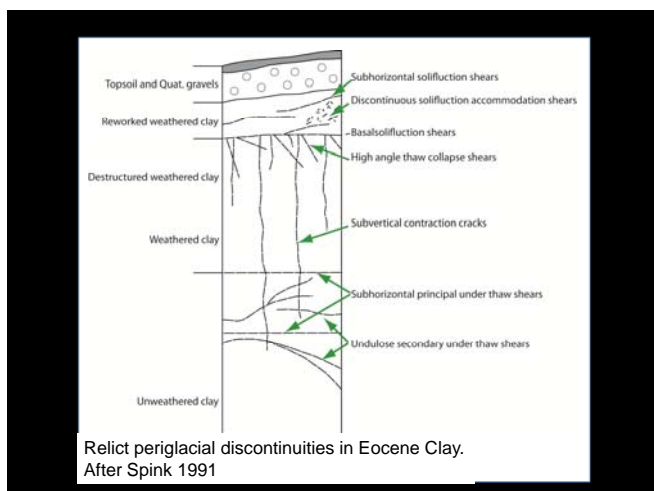
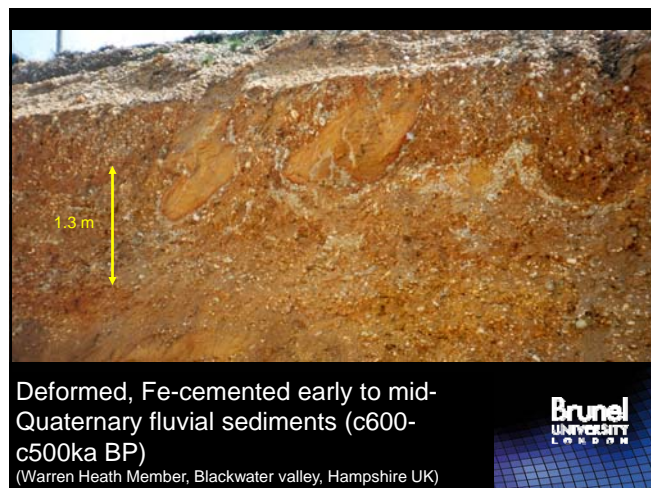
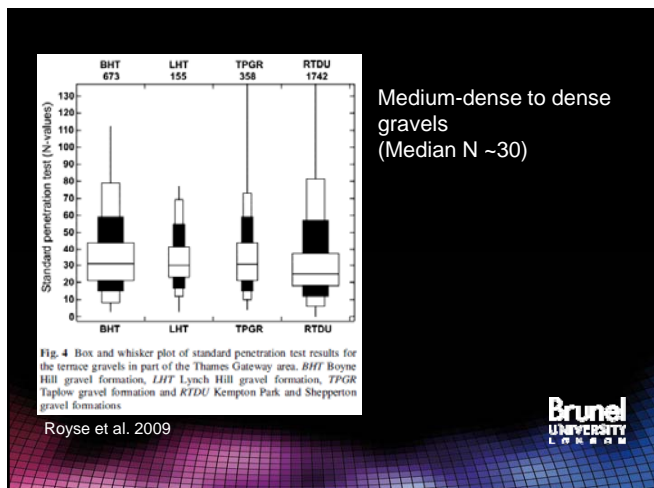
- Variable over different spatial and thickness scales
 - Sand and gravel, sand, silt, clay, brickearth, peat
 - Varying grading/sorting
- Pedogenically altered (often)
- Loose or cohesive

Nival-type fluvial gravels, Woolhampton

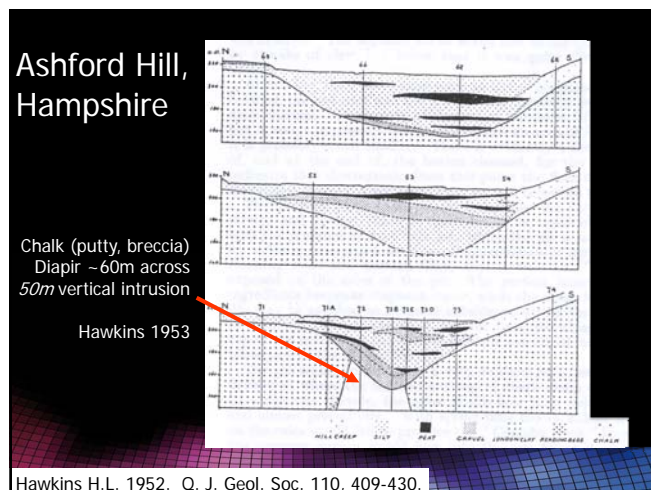
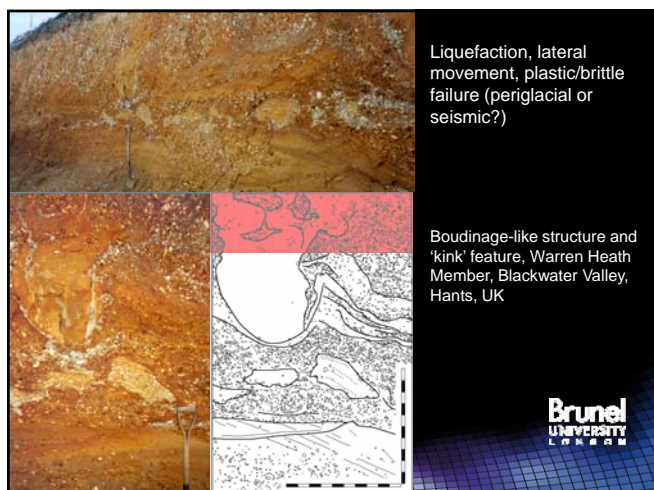
- Poorly-sorted (well-graded)
- Spatially and vertically variable
- Varying fines content
- Loose

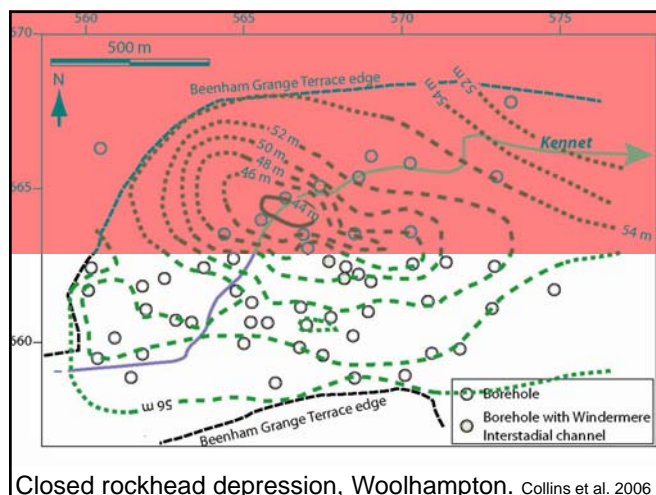




Issues

- Correlations and chronology
 - Linking fragments and points – which long profile?
 - Time gaps and rates of change
- Role(s) of tectonism/isostasy
 - Active or passive?
 - Glacial forebulge?
- Postdepositional changes
 - All periglacial?
 - Rockhead hollows





London Basin Forum

Unearthing London's Geology

- Coordinated by Prof Mike de Freitas
- Aims:
 - presentation of a state of the art baseline model
 - a comprehensive overview of London's geology
 - improved exchange between different parts of the geological community

Geological Atlas of the London Basin
A PRODUCT OF THE ROYAL SOCIETY AND BRUNEL UNIVERSITY LONDON

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Summary

- Quaternary deposits are extensive and physically variable
- Understanding long term evolution helps predict ground conditions
 - Aid to planning/executing SI and design
- Still lots of questions, even after 200 years of research
- Needs a renewed effort

–**London Basin Forum**

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