



**British
Geological Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL

Applied geoscience for our
changing Earth

Hydrological extremes CWC project – Project Board Meeting @ Imperial College

14th February 2011

BGS's input

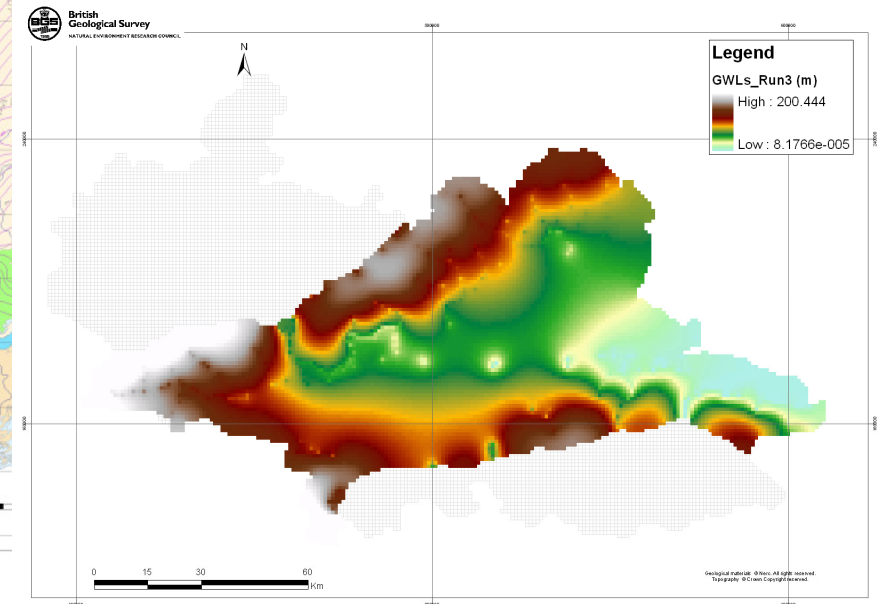
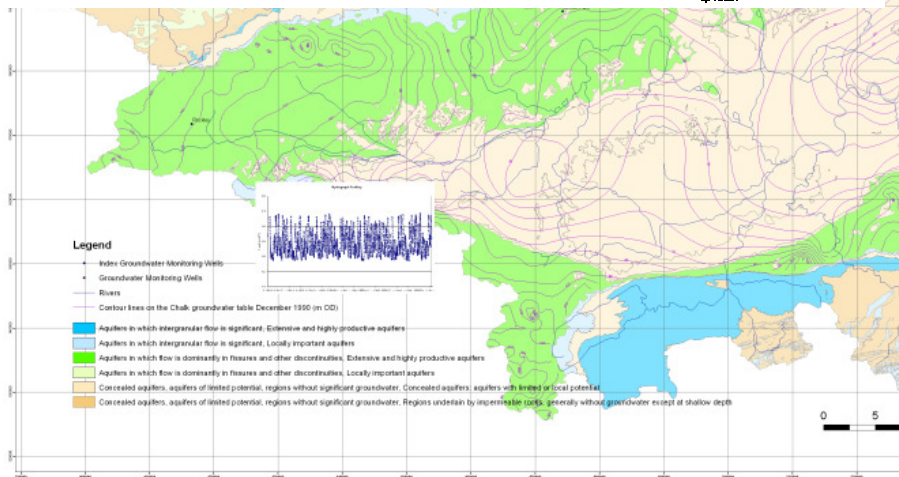
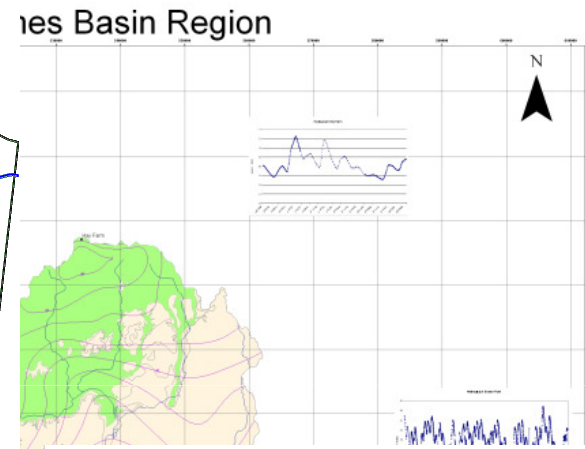
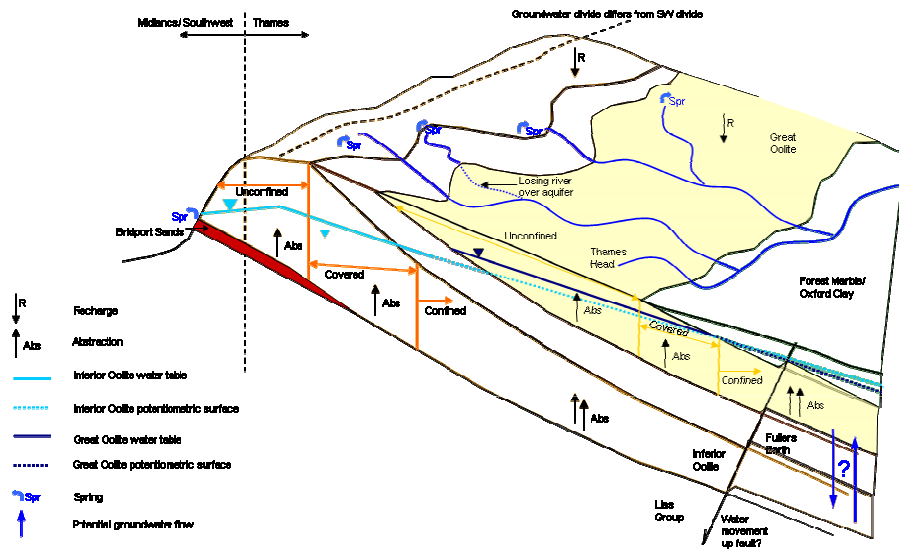


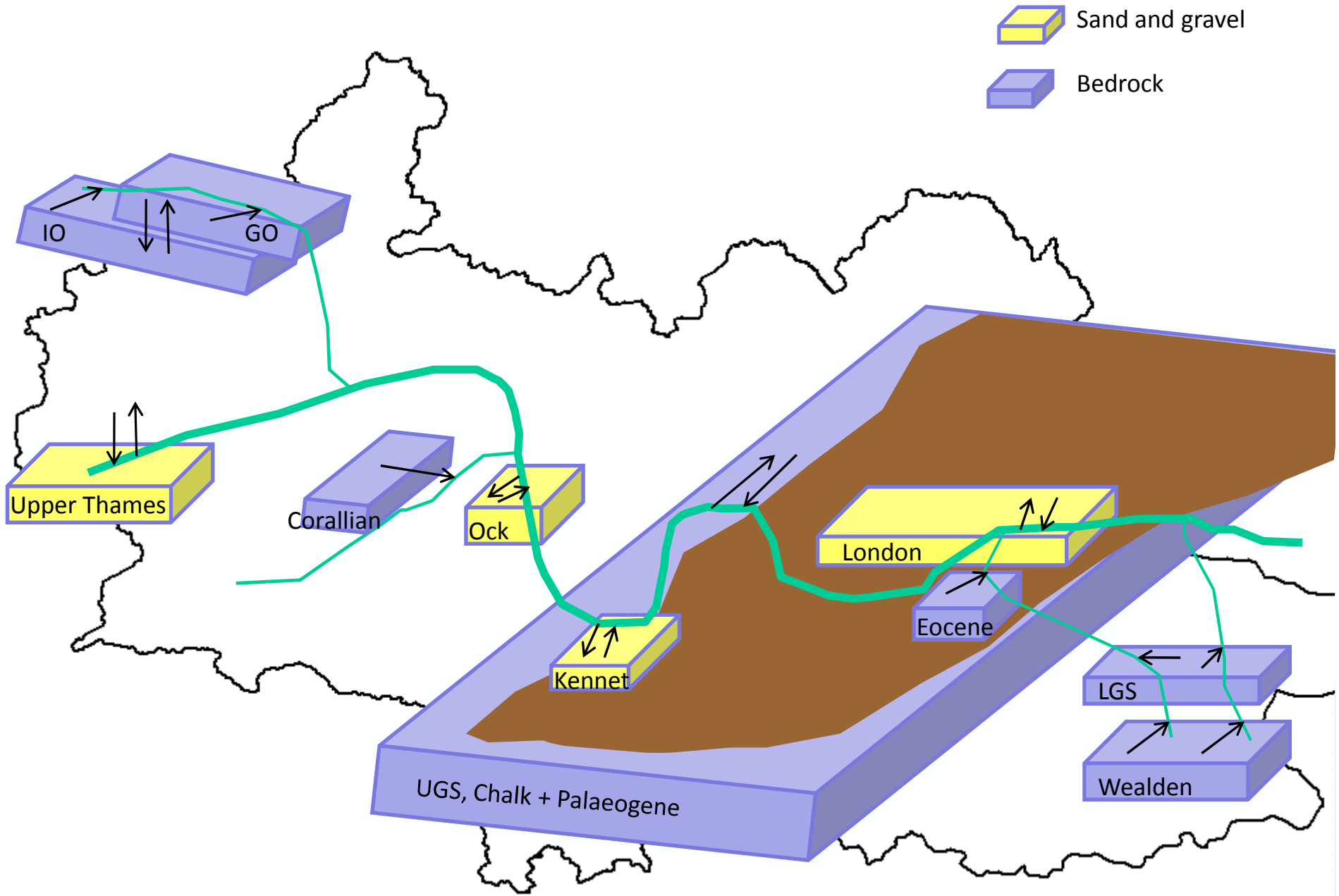
Feedbacks and extremes – groundwater perspective

- Feedbacks:
 - Climate change – Rainfall, temperature, windspeed, etc.
 - Land-use: human and natural response to CC
 - Recharge and abstraction – both modified
- Extremes:
 - Droughts and floods
 - Impacts on abstraction (DO)



Scale and complexity - Thames Basin



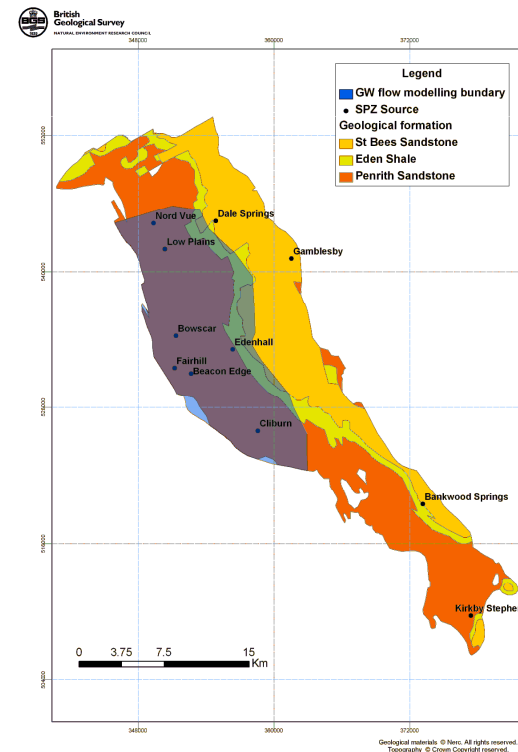


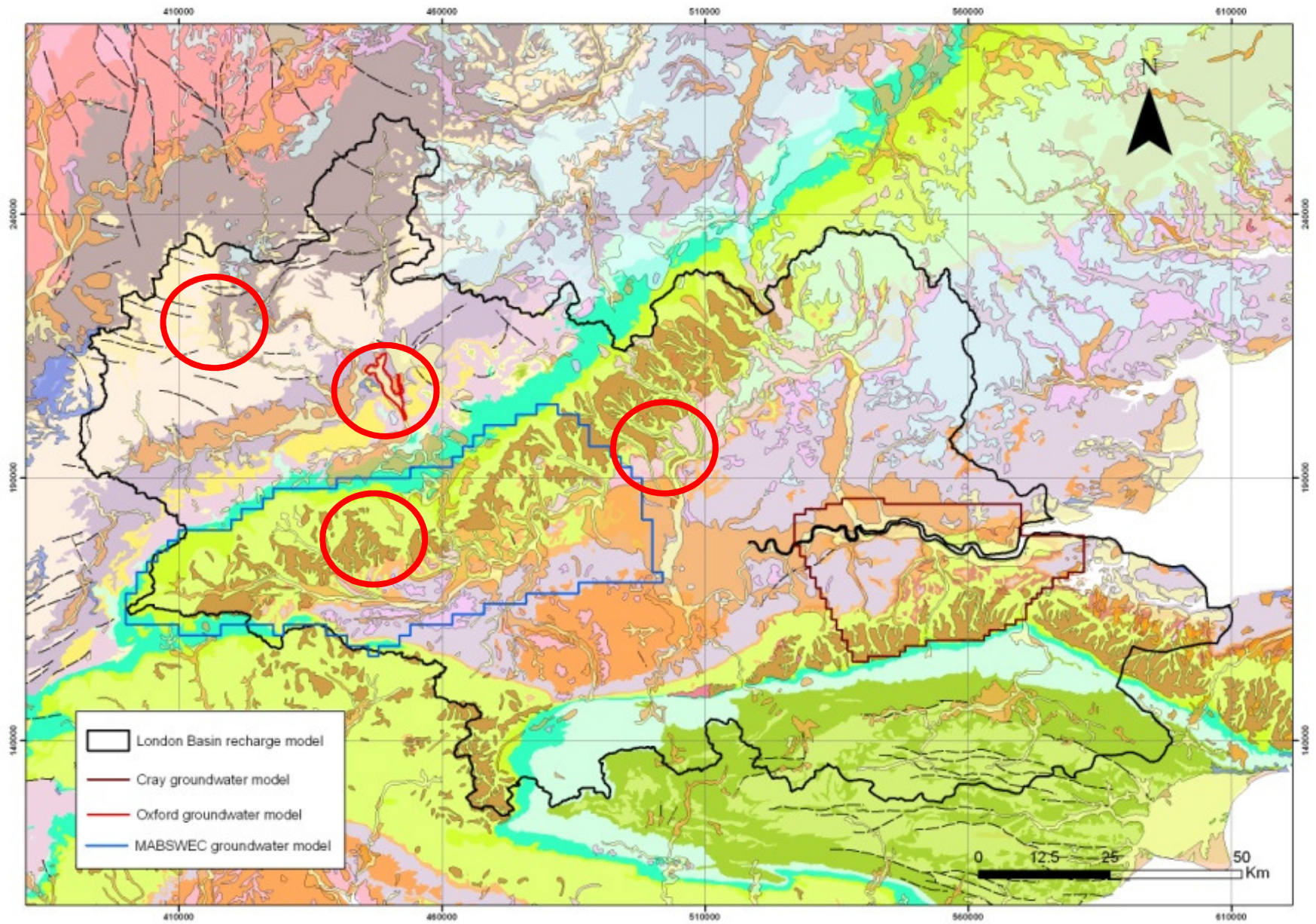
Potential study areas

- Thames basin
 - Oxford – GW enhanced flooding
 - Colne valley – adited sources
 - Pang/Lambourn – GW flooding and drought
 - Jurassic Lst – Baseflow under drought conditions

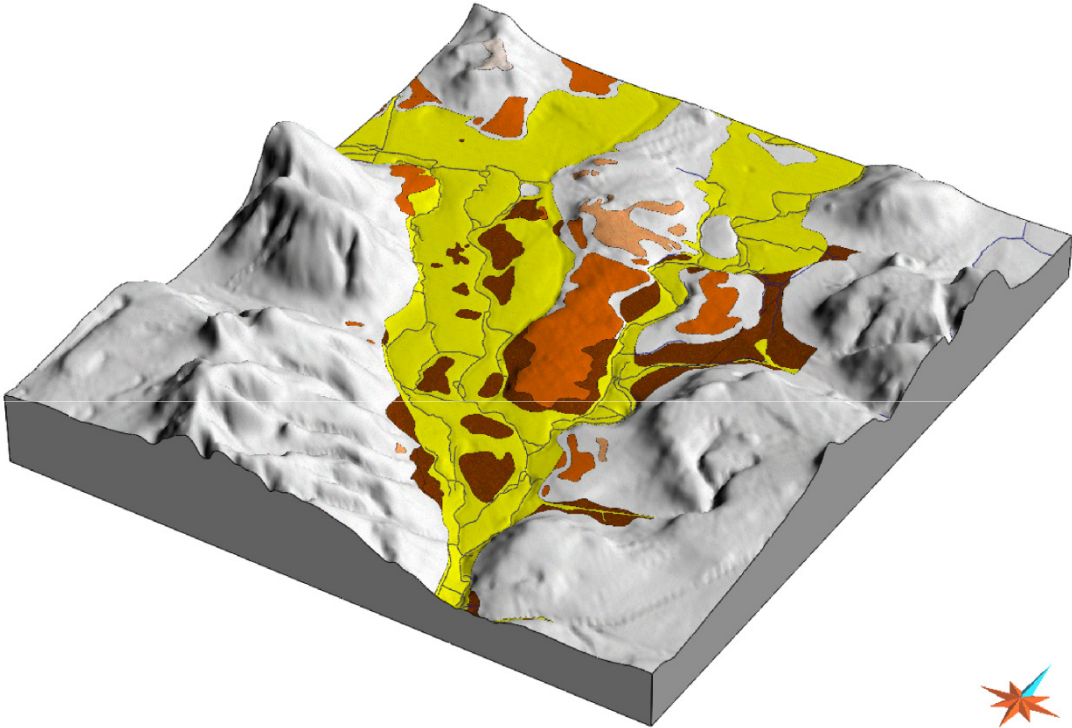
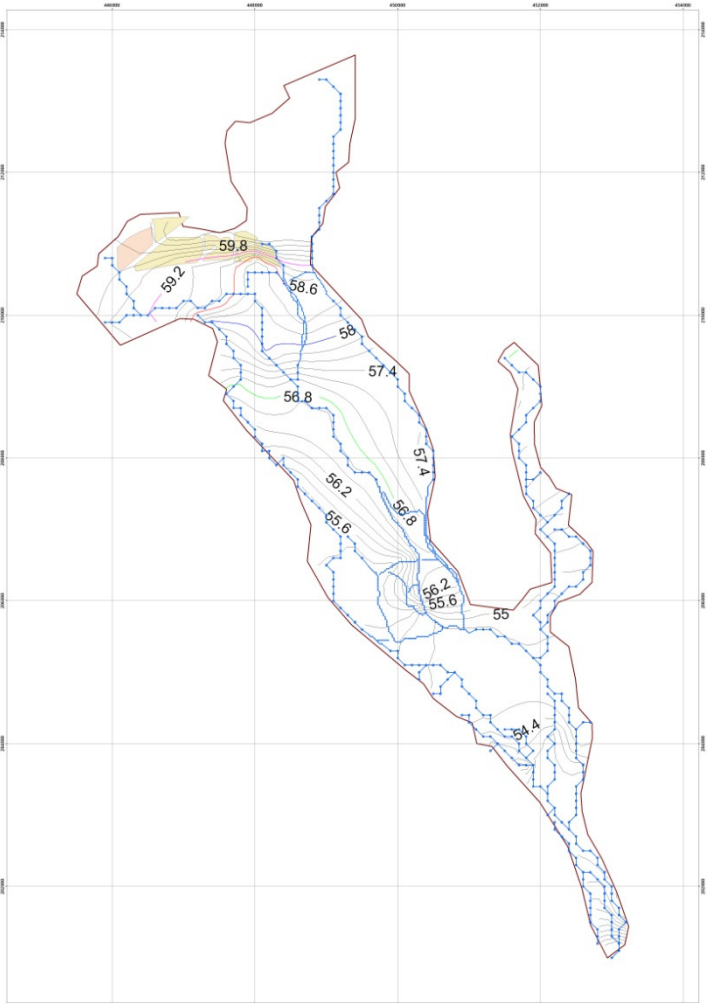
Not forgetting: Isle of Wight

- Eden Valley
 - Role of GW in flooding??
 - Security of GW abstraction

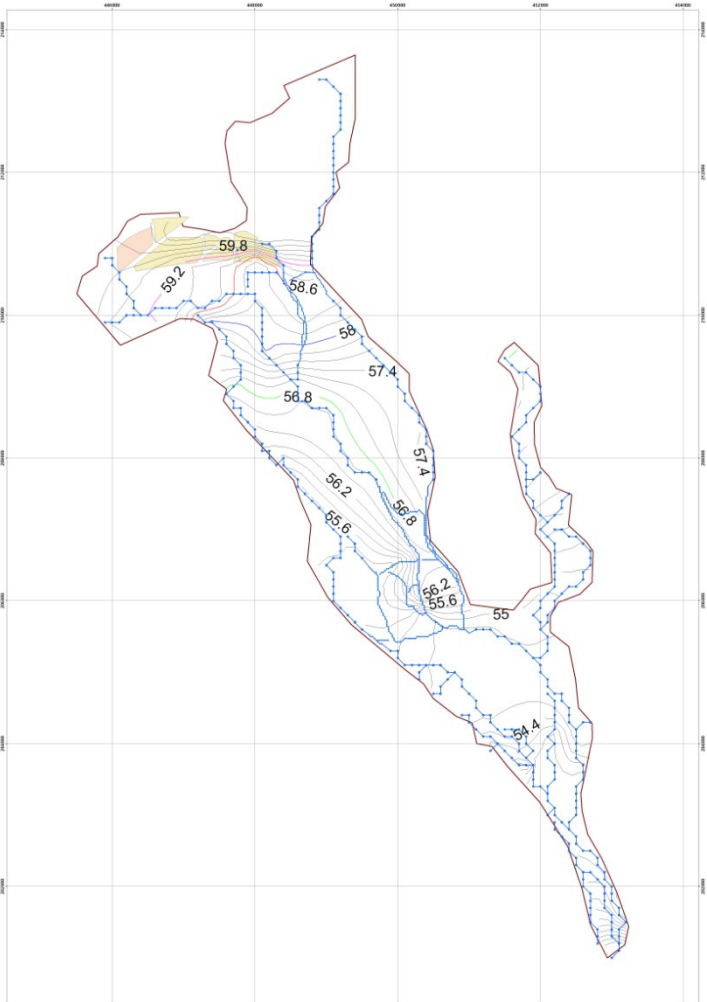




Oxford



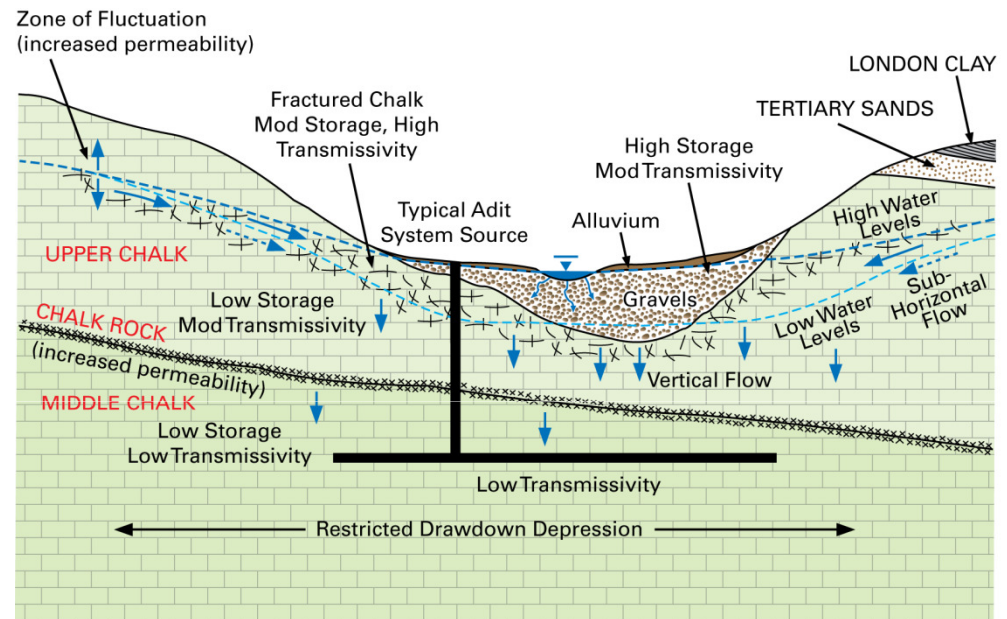
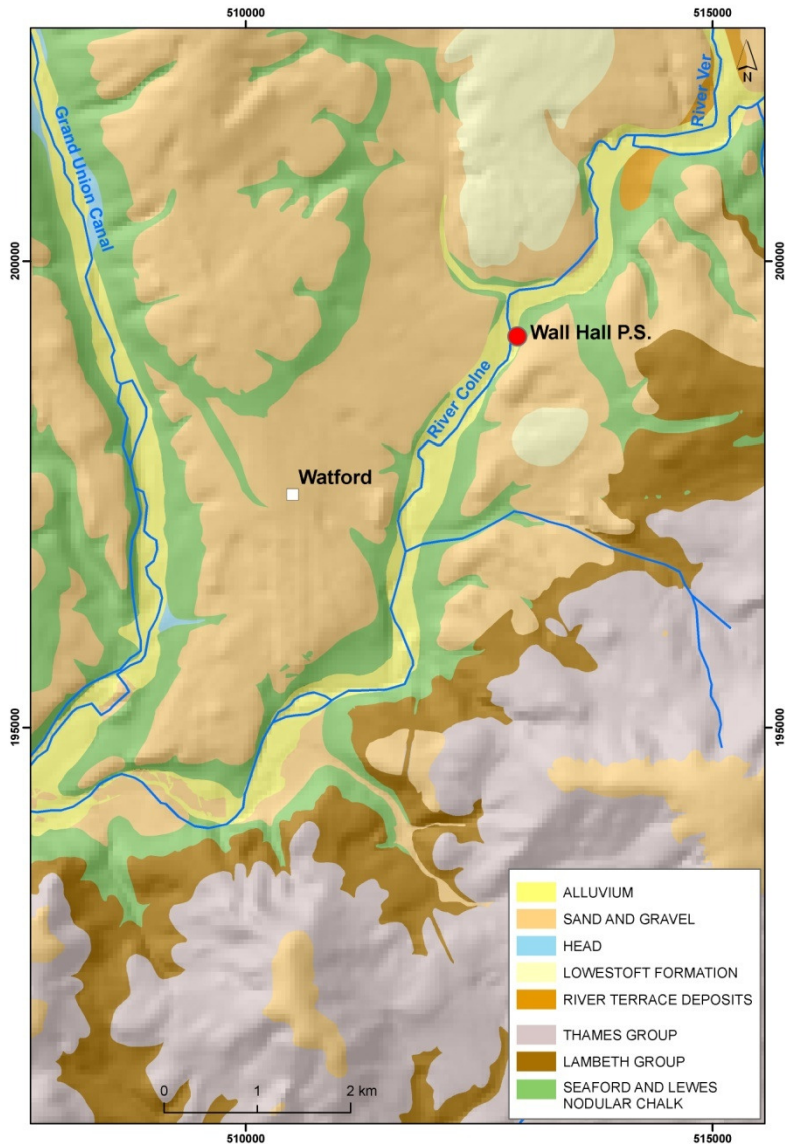
Oxford



A screenshot of the OpenMI Configuration Editor software interface. The window title is "Configuration Editor". The interface includes a menu bar (File, Composition, Options, Help), a logo for OpenMI, and a diagram showing a blue box labeled "Oatc: OpenMI Gui Trigger" connected to a yellow box labeled "ZOOM3D Oxford Model". Below this is a "Model properties" panel with sections for "Output Exchange Items" and "Input Exchange Items", both containing "Groundwater head", "Layer 1", "River baseflow", and "RiverID:1". To the right is an "ElementSet viewer" window showing a blue river network on a white background. Below the viewer is a "Description" panel with fields for "Line width" (2.0), "Margin width" (10), "RiverID:1", "Index: 0", and "ID: Branch 1". A "Close" button is visible in the bottom right corner of the viewer window.



Colne Valley

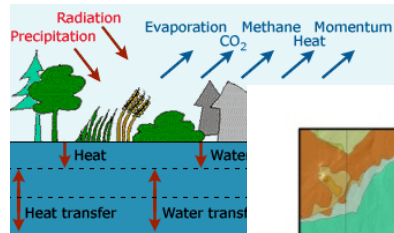
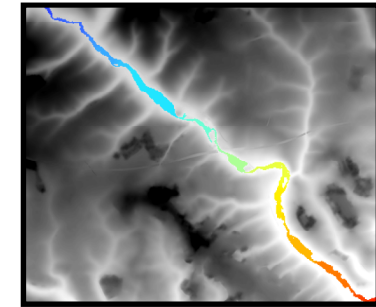


Note alluvium, sands and gravel, and river terrace deposits

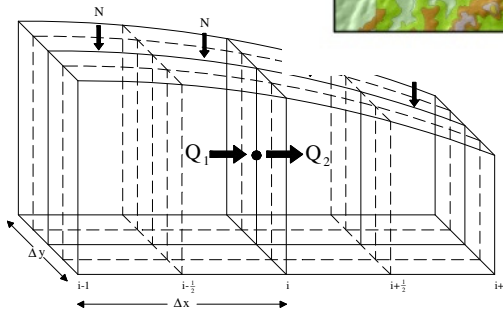
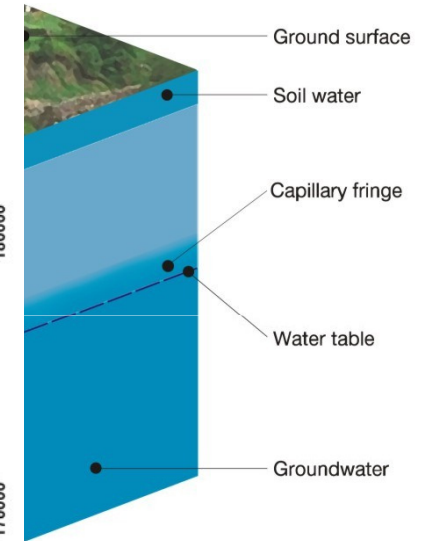
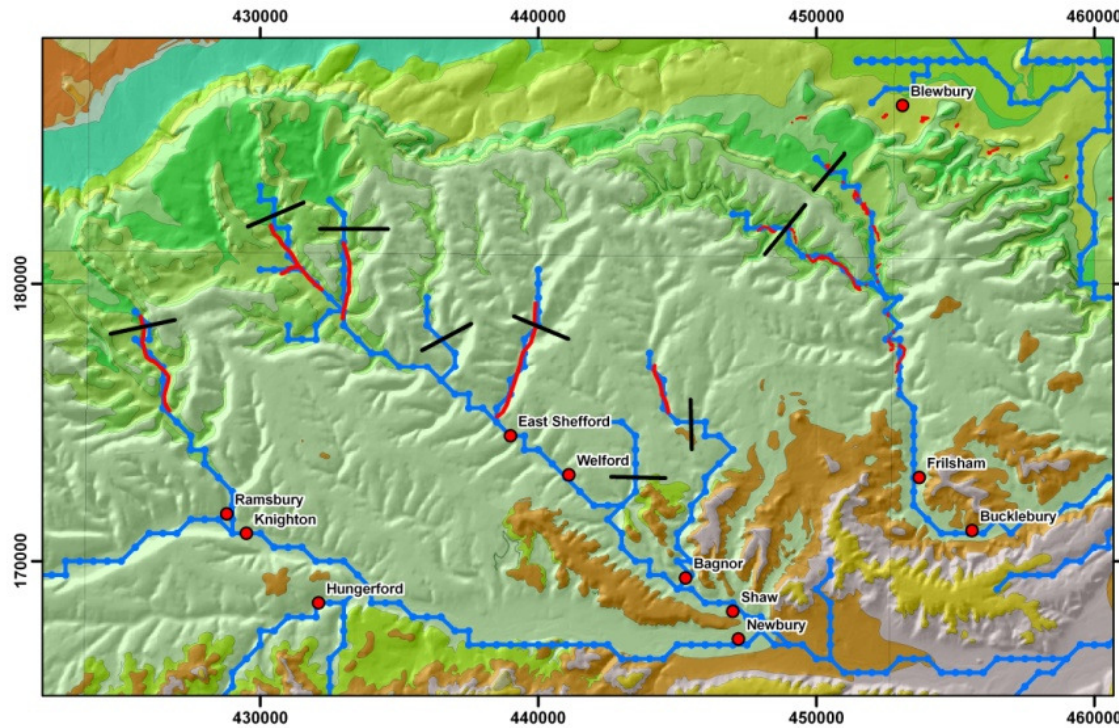
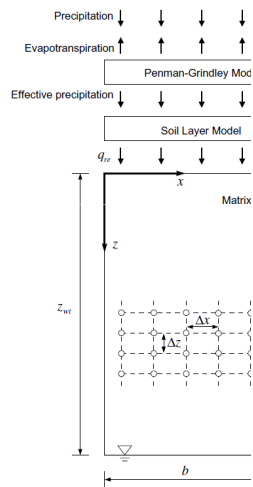


Pang/Lambourn

Overland Flow



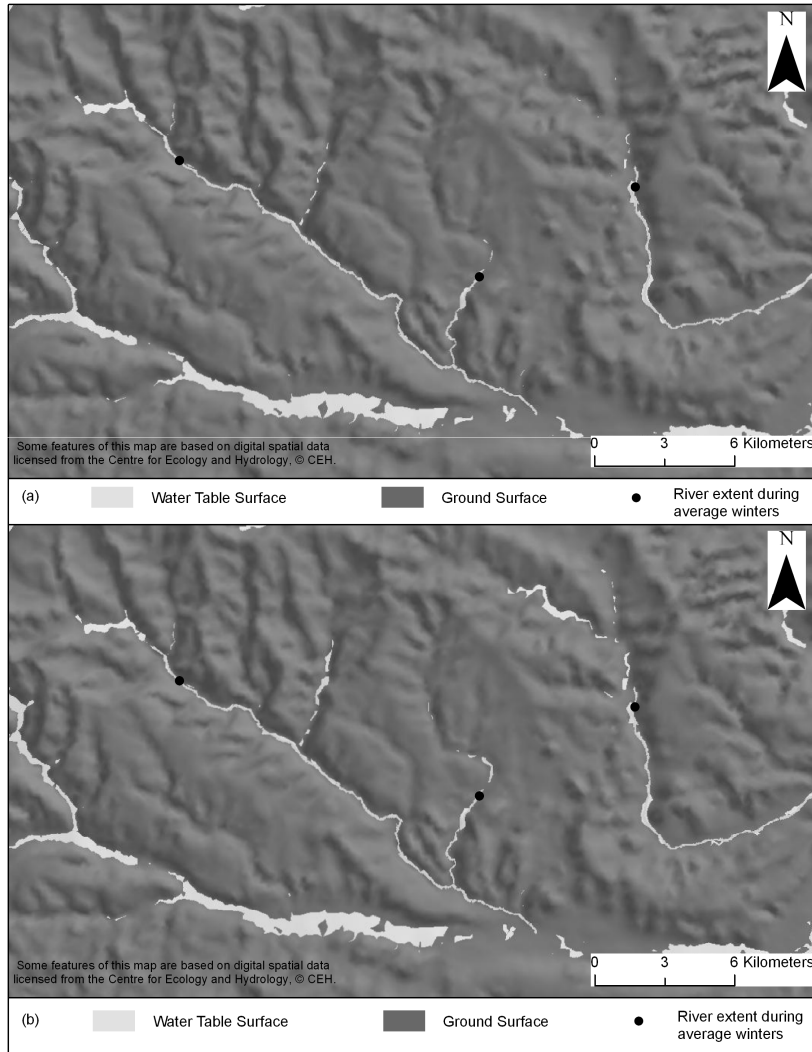
JULES: Soil Moisture



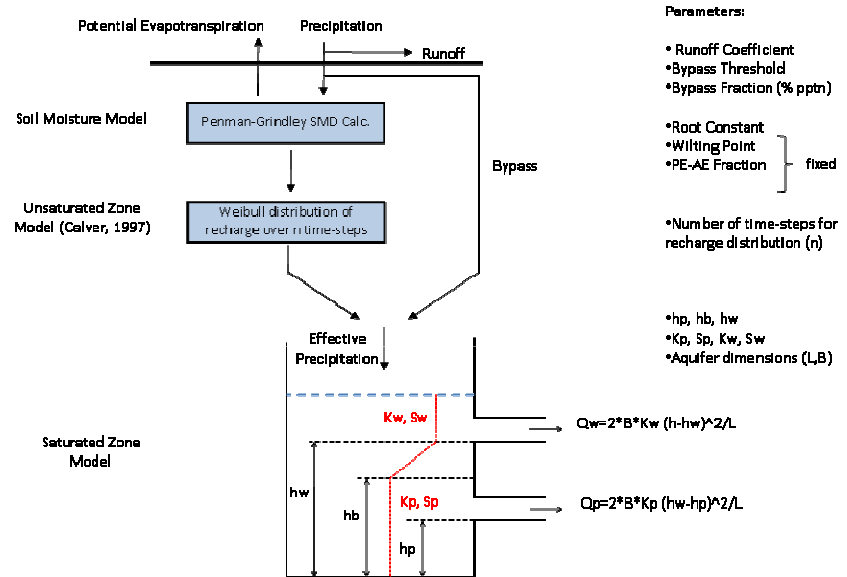
ZOOMQ3D:
Groundwater Flow



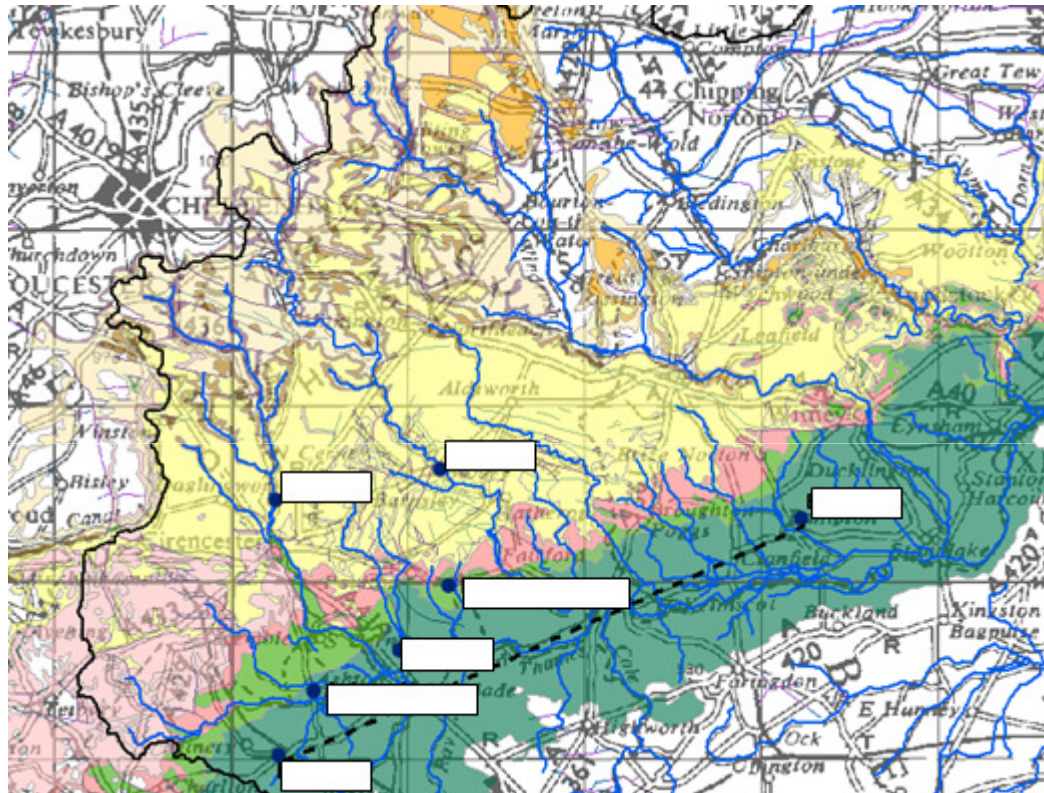
Pang/Lambourn



Simplified Modelling



Jurassic Lst



- BRIDPORT SAND FORMATION
- CHIPPING NORTON LIMESTONE FORMATI
- CORNBRASH FORMATION
- FOREST MARBLE FORMATION
- FULLER'S EARTH FORMATION
- GREAT OOLITE GROUP
- INFERIOR OOLITE GROUP
- KELLAWAYS FORMATION
- OXFORD CLAY FORMATION
- SHARP'S HILL FORMATION AND FULLERS

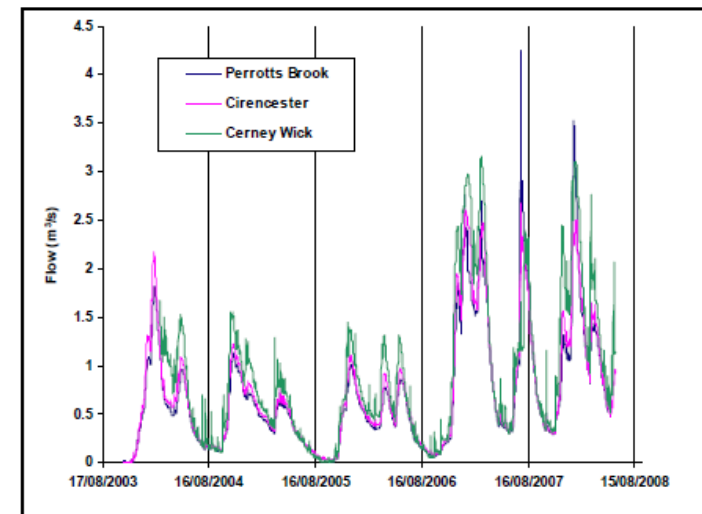
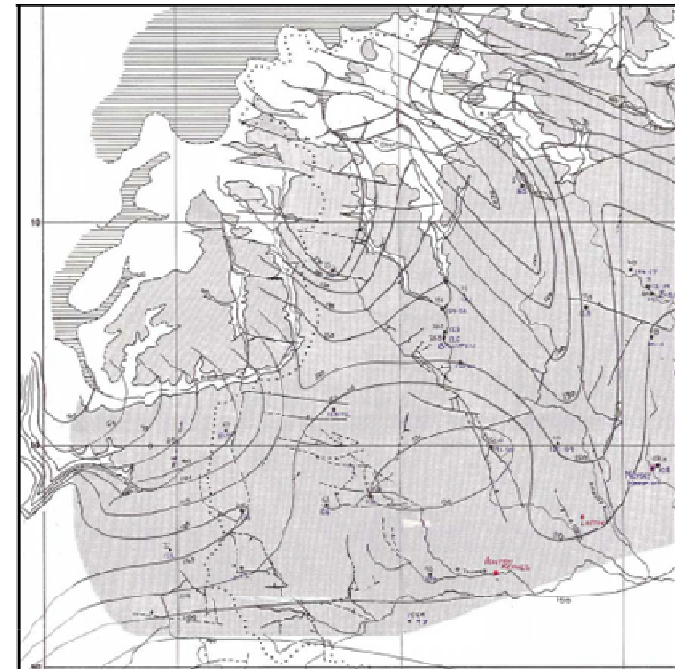
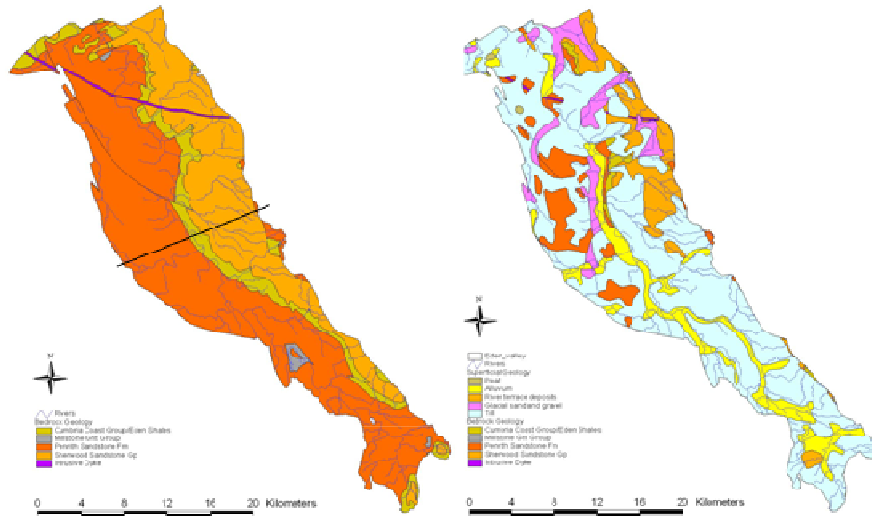


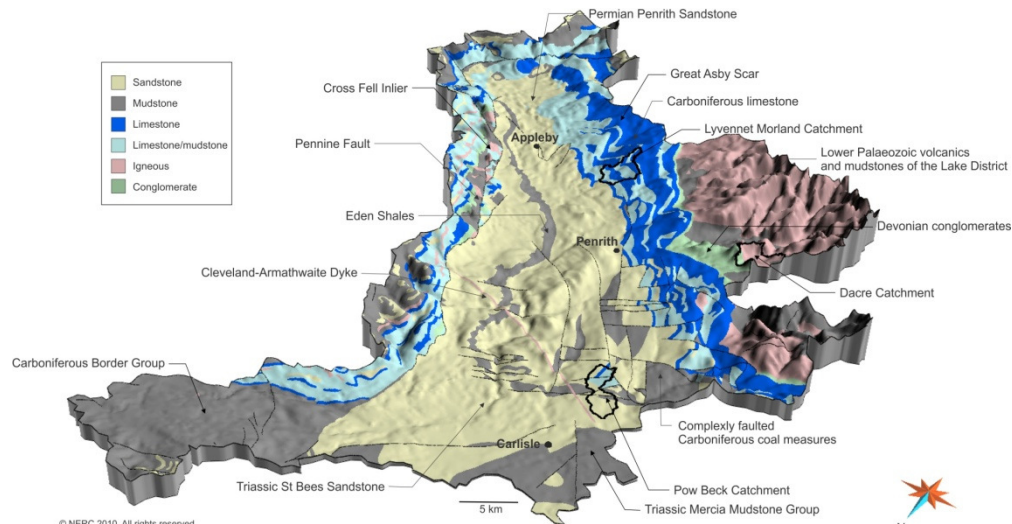
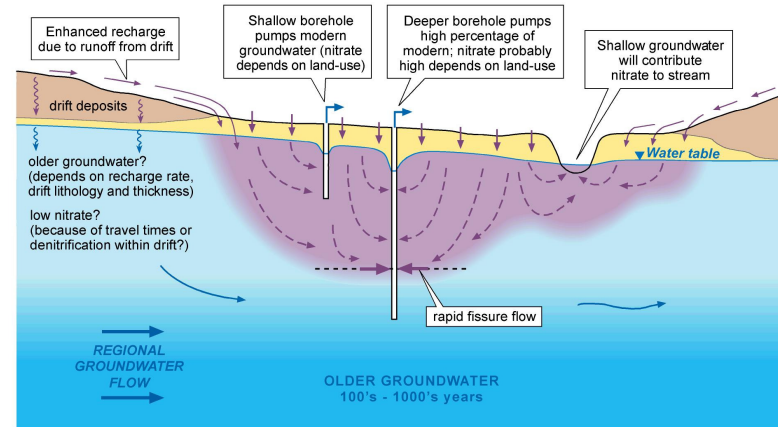
Figure 4.1 Flow between 2003 and 2008 at the long term gauging stations on the River Churn

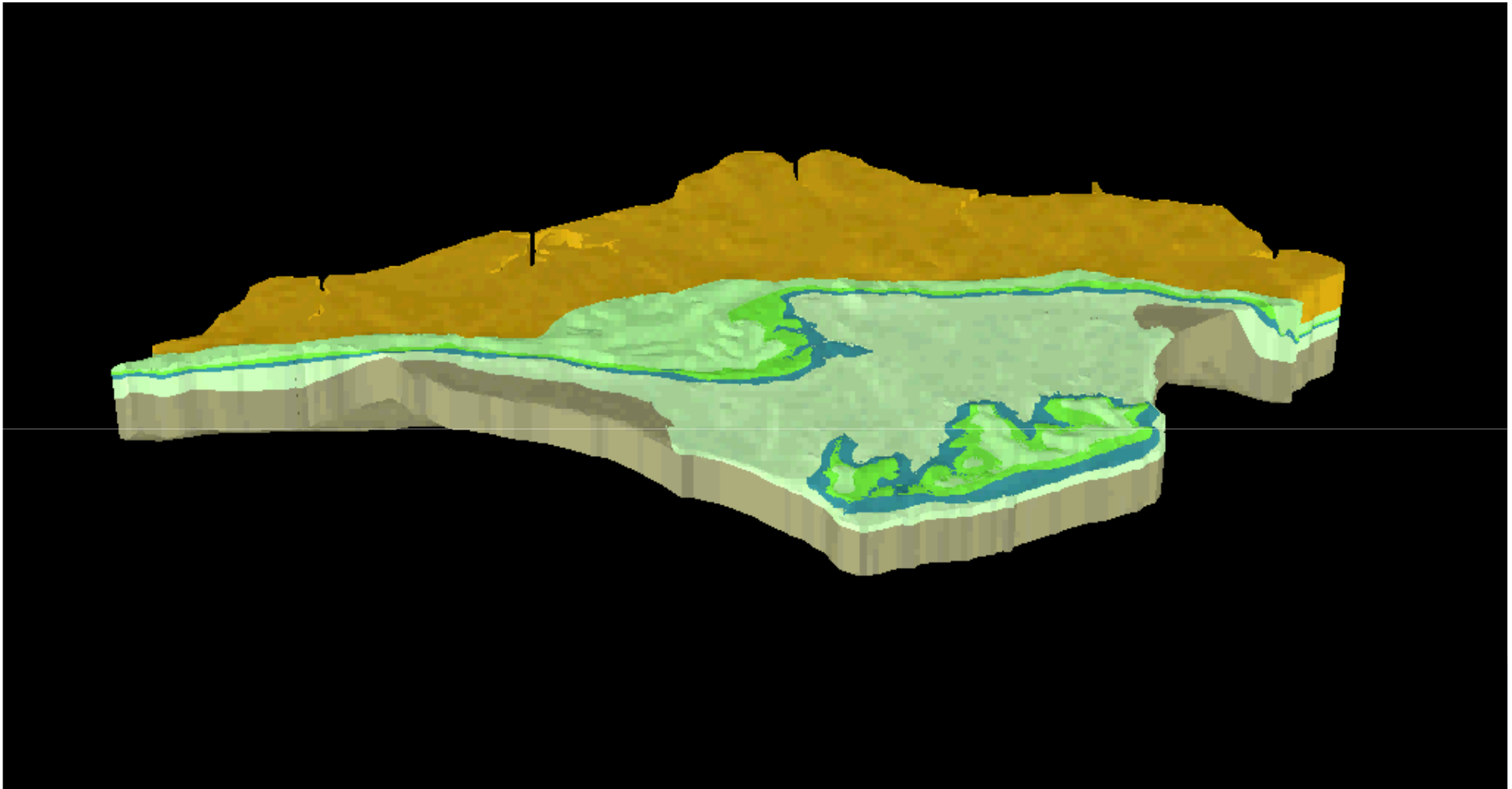


Eden Valley



CONCEPTUAL MODEL OF GROUNDWATER FLOW SYSTEM

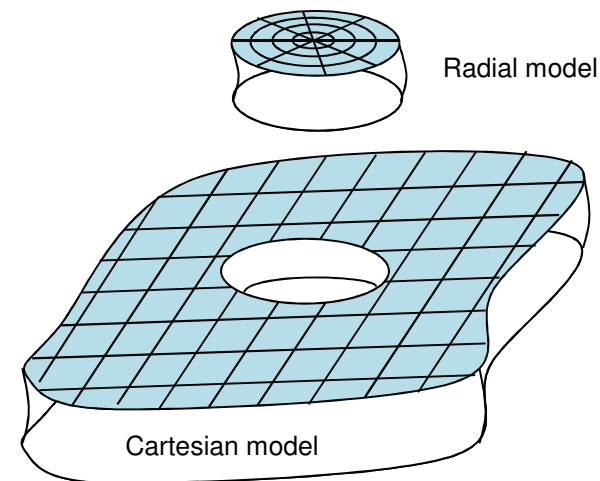
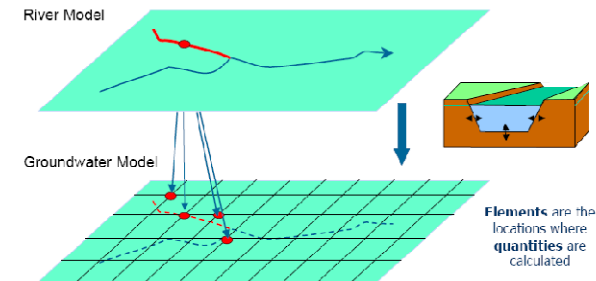




Catchment	Area	Geology	Issue	Current understanding	Approach
Eden	DTC test catchments	Permo-Triassic Sandstone overlain by superfcials	Groundwater availability during drought	Good - background u/s Limited – DTC catchments	Develop CM and GW model – recharge through superfcials likely to be higher important
Thames	Oxford	Oxford Clay overlain by superfcials	Groundwater flooding	Very good	Build on existing understanding/model
	Pang and Lambourn	Chalk overlain by superfcials	Groundwater flooding and drought	Very good	Build on existing understanding/model
	Cotswolds Jurassics	Sub-karstic limestone and complex structure	Baseflow to River Thames during droughts	Limited	Develop understanding of whole area then apply simplified approach.
Isle of Wight	Colne Valley	Chalk overlain by superfcials	Behaviour of adited sources during droughts	Good in valleys, poor elsewhere	Extend MaBSWeC to east by one catchment and then develop understanding/simulation of adited sources in the Colne Valley.
	Chalk	Cretaceous overlain by superfcials	Groundwater availability during drought	Good - background u/s	Develop understanding of whole area then support PhD student.

What we think we're doing

1. Choose study areas: likely to be Colne Valley, Thames Chalk, Jurassic Limestone and Oxford as well as Eden Valley. (WP2a)
2. Develop geological and hydrogeological understanding. Characterisation of soil and, superficial and bedrock cover (thickness and hydraulic properties). (WP2a)
3. Decide on generic examples and create investigative models to understand particular issues. (WP2a/b)
4. Develop modelling system to tackle operational issues – linking regional scale model to borehole scale models. (WP2b)
5. Run scenarios: Flooding and droughts. (WP2c)



Hydrological extremes CWC project – Project Board Meeting @ Imperial College

14th February 2011
BGS's input



© NERC All rights reserved

