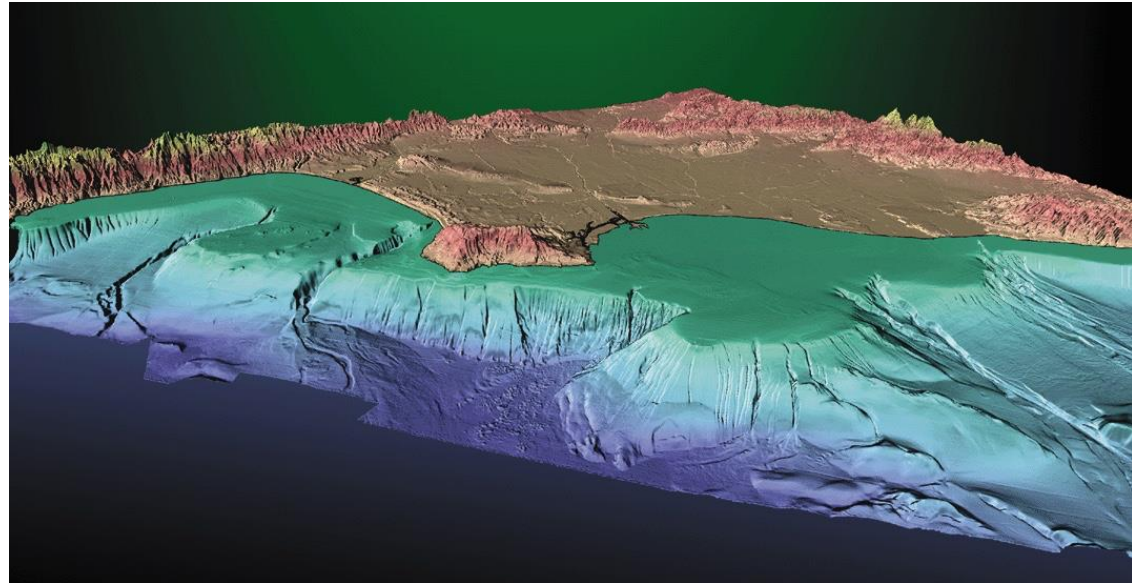


# Offshore Aquifers: An Answer to Water Scarcity?



Renee Martin-Nagle

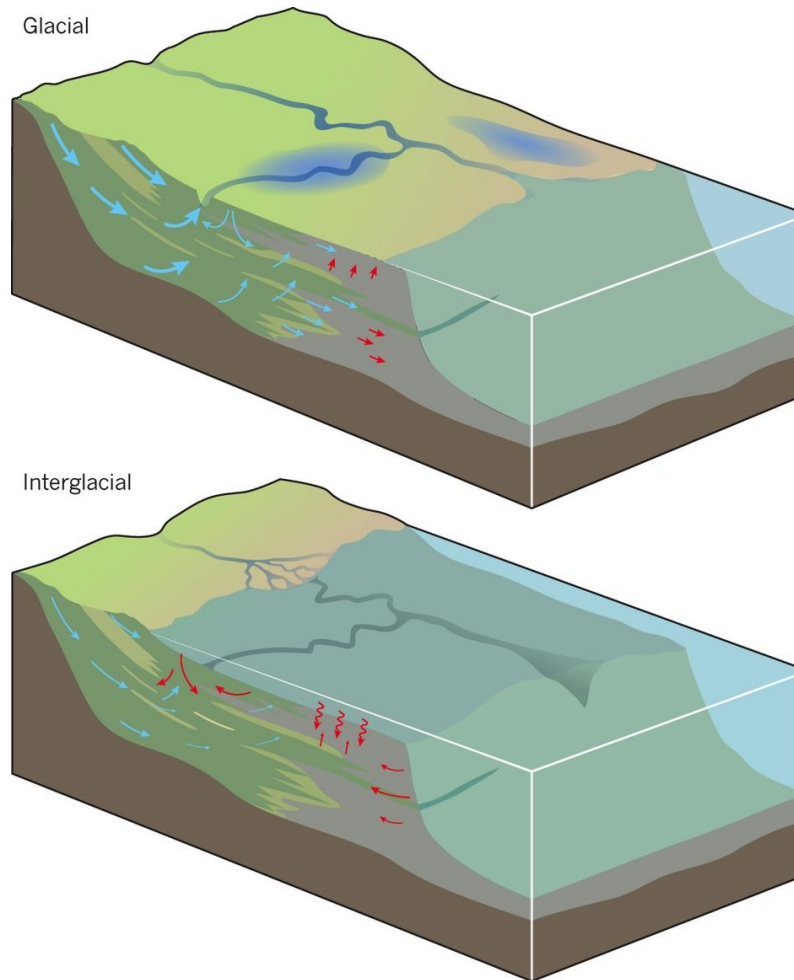
PhD Researcher, , University of Strathclyde

Treasurer, , International Water Resources Association

Visiting Scholar, Environmental Law Institute

43<sup>rd</sup> IAH Congress  
28 September 2016  
Montpellier France

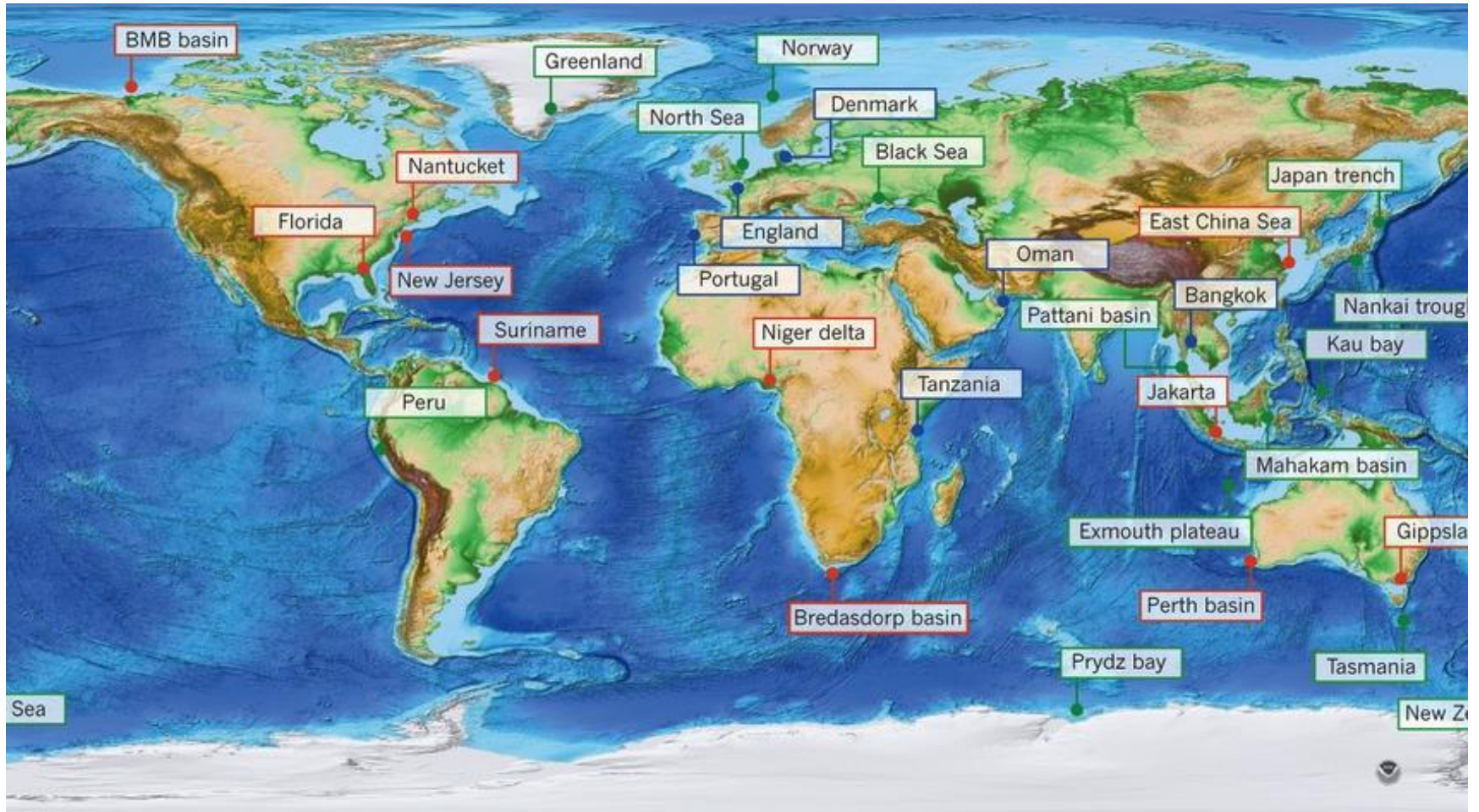
# Origins of offshore aquifers



# Diligent scientists

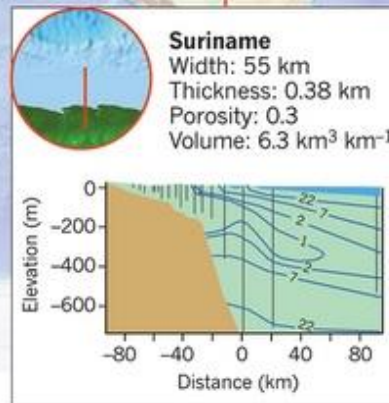
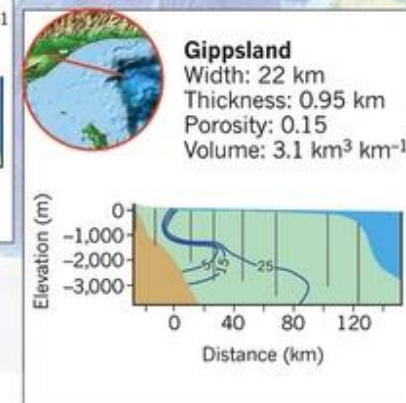
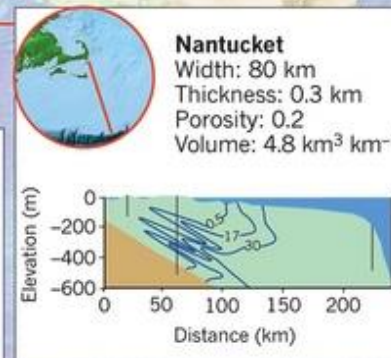
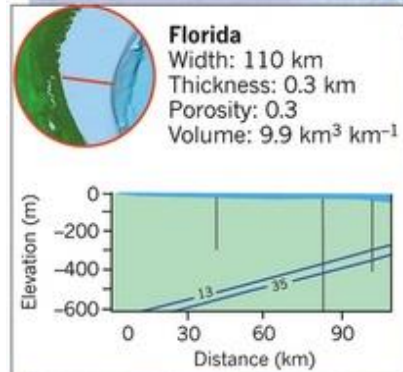
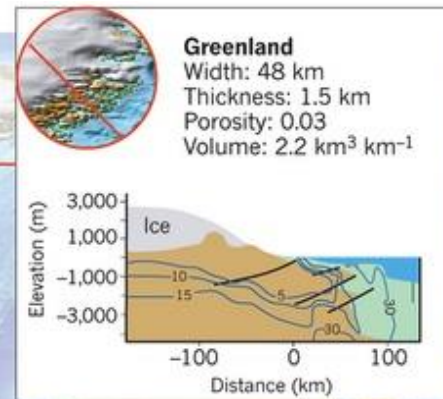
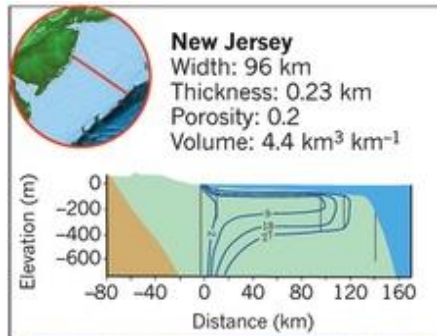
- 1976 – USGS discovered anomalous fresh water lenses under Nantucket Island MA (F.A. Kahout and J.C. Hathaway)
- Decades of studies and publications followed
- 2013 Nature article attracted global attention (Vincent E.A. Post, Jacobus Groen, Henk Kooi, Mark Person, Shemin Ge & W. Mike Edmunds)

# Locations of offshore aquifers



Source: Nature Dec. 2013

# Inferred key metrics

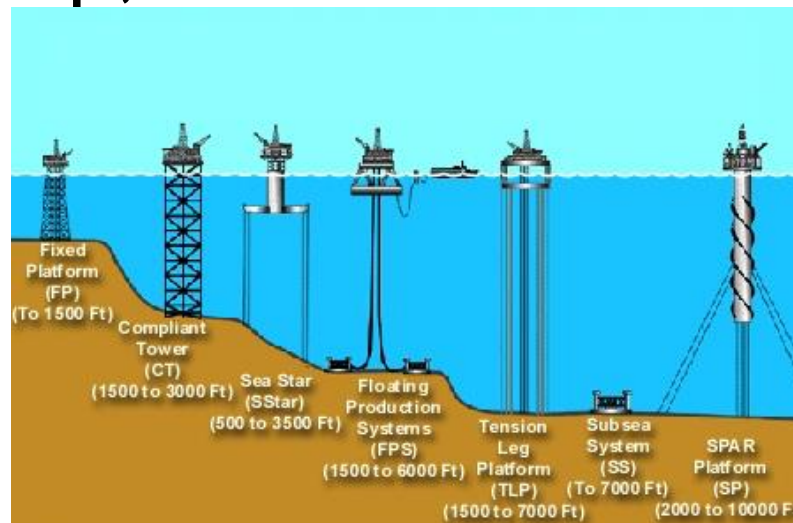


## Some facts

- Verified under CS of US, Suriname, Indonesia, Tanzania, Australia, Greenland, Denmark, South Africa, Nigeria, Canada, China
- Many have onshore connections
- Protected by thick confining layers
- Estimated volume of global offshore fresh water ( $<1 \text{ g l}^{-1}$  TDS) is  $3 \times 10^5 \text{ km}^3$

# Threshold issues

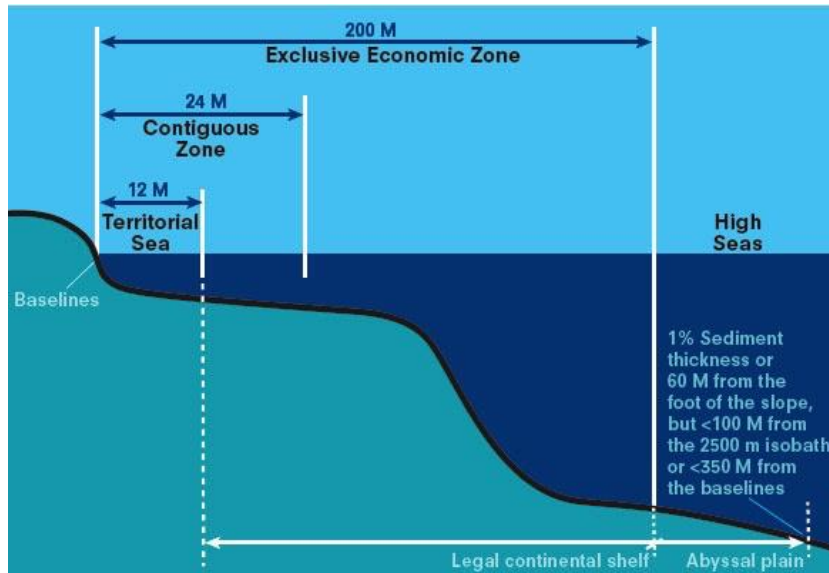
- Financing
- Offshore drilling impacts
- Seawater intrusion
- Infrastructure for transport and treatment
- Ownership, distribution and allocation



Source: [naturalgas.org](http://naturalgas.org)

# Possible governance regimes

- UN Convention on the Law of the Sea
- Customary practices of offshore oil & gas
- Customary laws of land-based water



Source: [reparationlaw.com](http://reparationlaw.com)



# Transboundary guidance

- Law of the Sea – equitable arrangements
- Oil and gas – joint development
- Land-based water – reasonable and equitable use; no significant harm



# Conclusions

- Huge volumes of water are in CS
- Technical, financial and legal challenges exist
- Offshore aquifers are not yet a viable solution to global water scarcity
- More study should and will be done



University of  
**Strathclyde**  
**Glasgow**