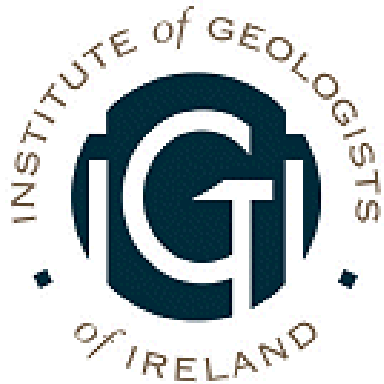


GEOSCIENCES:
*Challenging Careers
for Challenging Times*

Deirdre Lewis

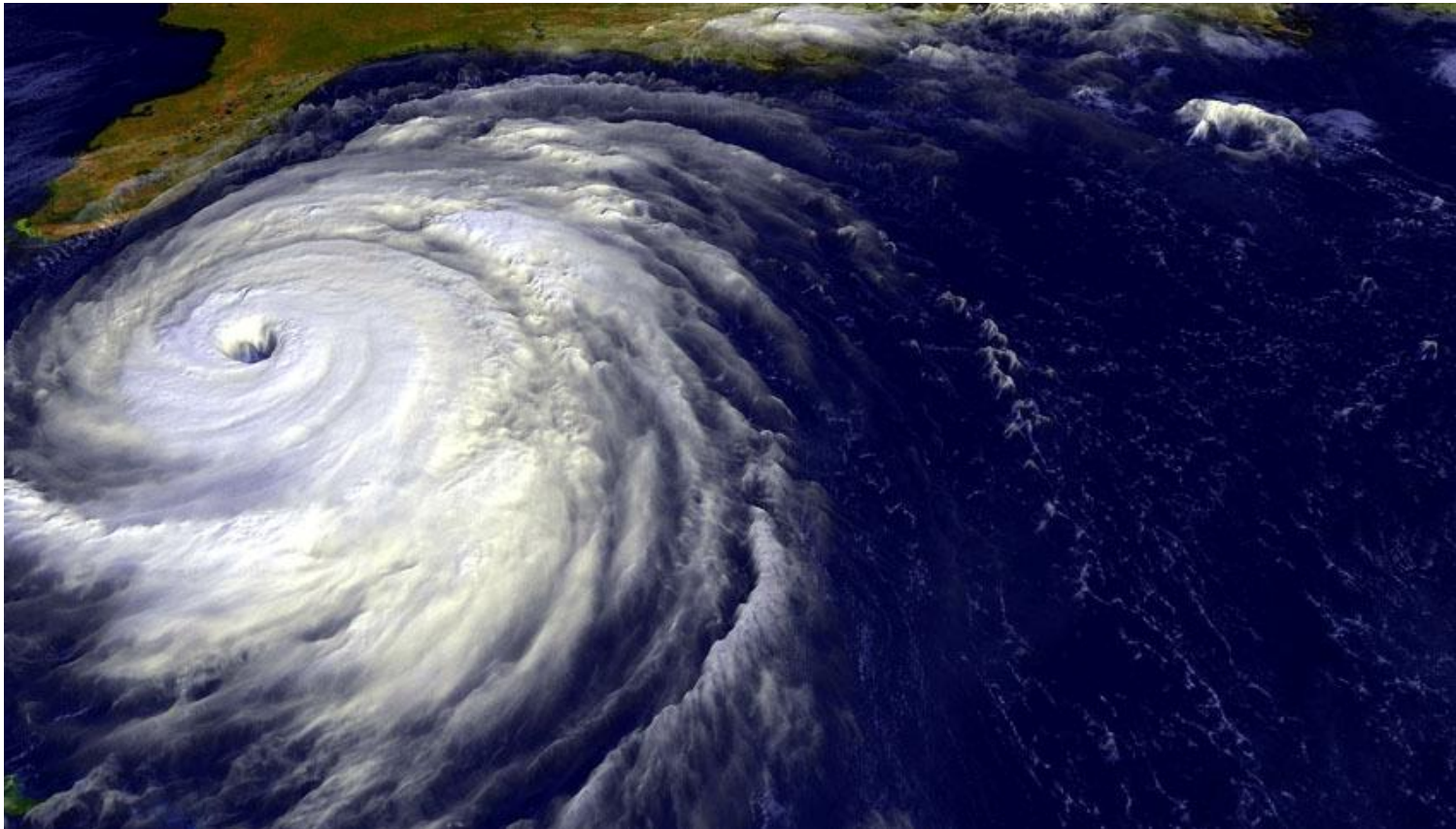
Institute of Geologists in Ireland

25 April 2009



What is Geoscience?

Knowledge (logos) of the Earth (geo)



Geoscience Disciplines.....

- **Geology**
 - **Geochemistry**
 - **Geophysics**
 - **Hydrogeology**
 - **Volcanology**
 - **Palaeontology**
 - **Sedimentology**
 - **Meteorology**
 - **Engineering (geotechnical, mining, petroleum)**
- **Geomorphology**
 - **Mineralogy**
 - **Seismology**
 - **Hydrology**
 - **Oceanography**
 - **Palaeoecology**
 - **Stratigraphy**
 - **Glaciology**



Geosciences

Understanding the complexity of Earth

- **Concept of Time - over 4 billion years**
- **Geological cycles: change is constant**
- **Tectonic / plate movements**
- **Inter-connectivity of Earth's systems (*Gaia*)**
- **Evolution of species and habitats**
- **Environmental systems (habitat, water, soils)**
- **Climatic systems interplay**
- **Natural heritage**



Geosciences

Human evolution intrinsically linked to use of Earth Resources

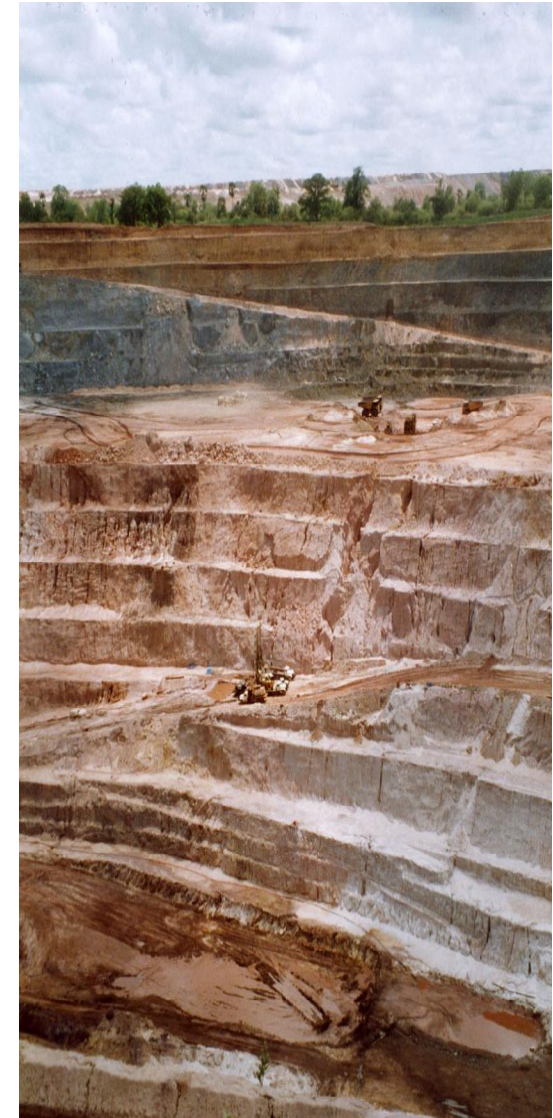
- **Stone Age (*Lithos = stone*)**
 - Palaeolithic, Mesolithic, Neolithic
 - Working of stone/ flint for weapons, building
- **Bronze Age**
 - Working of metals: gold, copper, tin (alloys)
- **Iron Age**
 - Advanced working of metals (smelting, metallurgy at high temperatures)



Geosciences

Modern usage of Earth resources

- **Water & Soils**
- **Mineral Resources**
 - Quarrying (aggregates, stone)
 - Exploration & Mining (Au Cu Zn etc)
- **Petroleum Resources**
 - Oil, gas, condensates
- **Energy Resources**
 - Coal, uranium



Geoscience

Careers with Government

- *Dept. Communications, Energy & Natural Resources*
 - Geological Survey of Ireland
 - Exploration & Mining Division
 - Petroleum Affairs Division
 - Marine Institute
 - Sustainable Energy Ireland
- *Dept. Environment Heritage & Local Government*
 - Environmental Protection Agency
- *Dept. Agriculture*
 - Teagasc

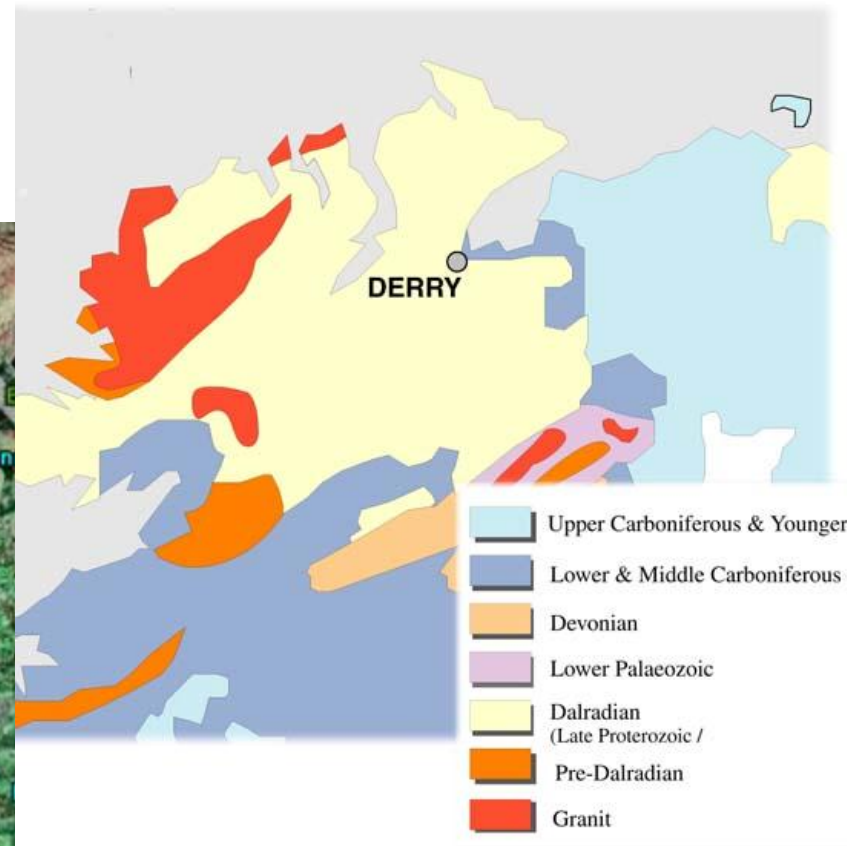
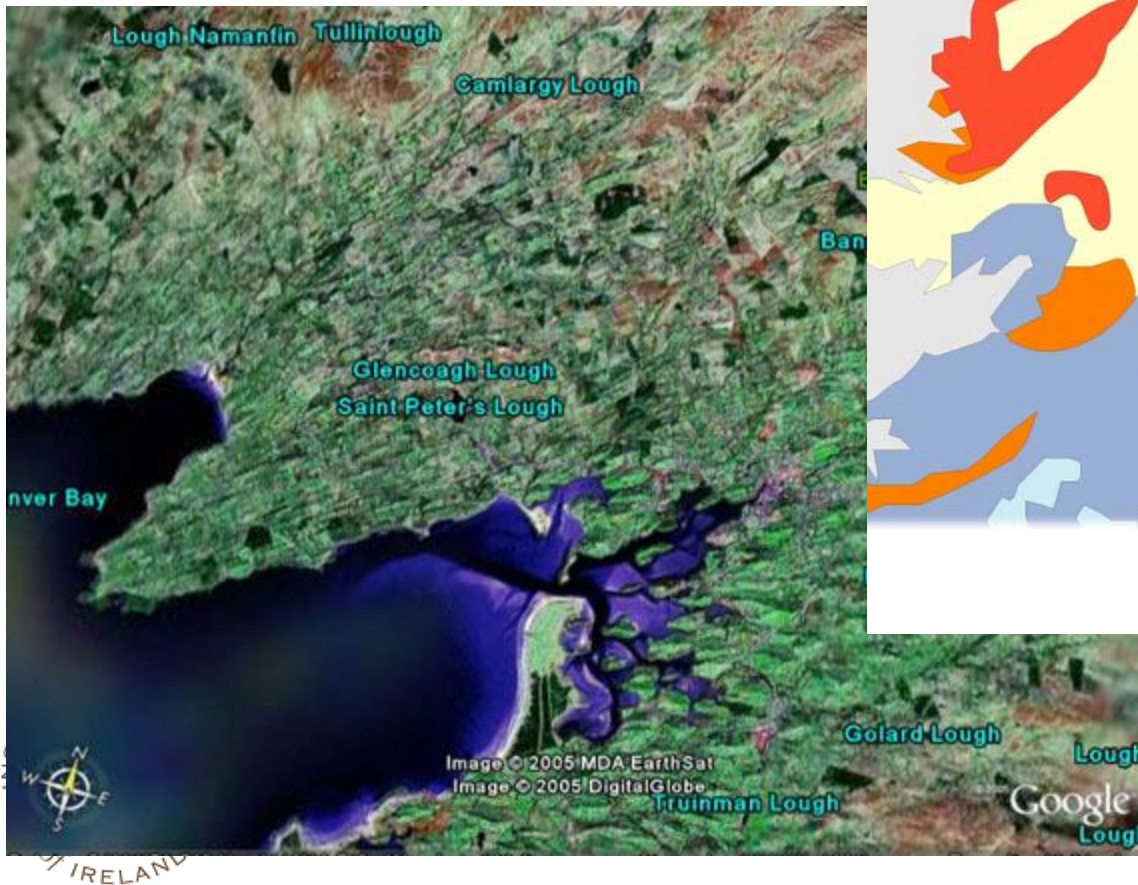


The State: Managing our Resources

- *Dept. Communications, Energy & Natural Resources*
 - Mapping our geology, geomorphology, resources
 - Groundwater characterisation & protection schemes
 - Surveying our offshore resources (INSS)
 - Admin, regulation & promotion of minerals
- *Dept. Environment Heritage & Local Government*
 - Monitoring water, soils, atmospheric quality
 - Coastal, estuarine, marine environments
- *Dept. Agriculture*
 - Soils mapping & characterisation



Geoscience: Mapping our Resources

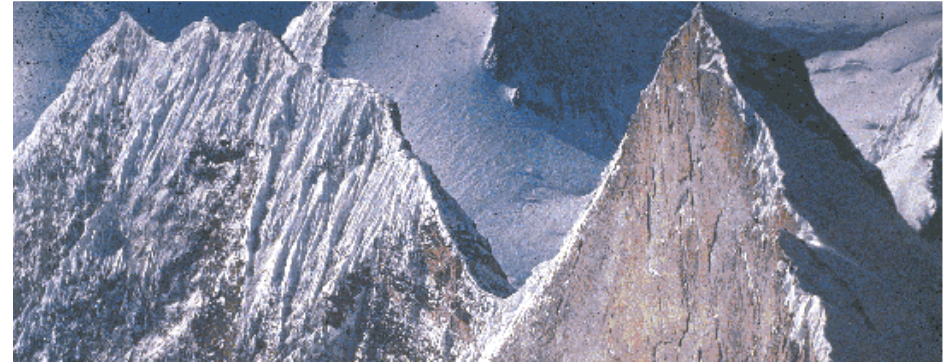


Geoscience Careers - Minerals

- **Mineral Exploration**
 - Exploration - zinc, lead, gold, talc
 - Geophysics/ geochemistry/ geology
 - Ore genesis
- **Mining**
 - Tara / Lisheen/ Galmoy
 - Mining legacy (+/-) environ'l remediation
 - Mining heritage
 - (e.g. Avoca, Allihies, Copper Coast)



Geoscience Careers



- **Geophysics**
 - Physical properties of the Earth
 - 3-D characterisation of the crust/ mantle
 - Predicting & monitoring of seismic/ volcanic activity
 - International early warning networks
 - Mineral/ Petroleum exploration - predictive
- **Geochemistry**
 - Exploration for minerals - targeting
 - Laboratory analyses
- **Understanding complex earth systems**



Geoscience Careers

- **Hydrogeology**
 - Aquifer & groundwater resource characterisation
 - Groundwater protection schemes
 - River basin management schemes
 - Implementation EU Directives (WFD,coast, estuarine)
 - Flood management
 - Coastal zone management



Geoscience Careers

- **Quarrying**
 - Aggregates, stone, sand & gravels
 - Environmental planning & monitoring (dust, noise, water, habitats, geochemistry etc)
 - Mineral surveying
- **Geotechnical Engineering**
 - Roads/ Infrastructure
 - LUAS, rail, tunnels
 - Urban planning
 - Energy projects



Geoscience Careers

- **Environmental Management**
 - **Inputs to all other disciplines**
 - **Environmental impact assessments**
 - **Advisory on karst, geo-heritage**



Geoscience Careers - Energy

- **Geothermal Energy**
 - Resource characterisation
 - Deep drilling for heat
 - Research
- **Hydro, Wind, Ocean , Wave**
 - Inputs to other disciplines
 - Resource assessment & characterisation
 - Research
- **Geotechnical Engineering - stability**



Geoscience Careers

Geo-Heritage

- **Mining Heritage**
 - UNESCO Geoparks
 - Mining Heritage
- **Geo-Tourism**
 - Walking trails – interpreting the landscape
 - Cliffs of Moher, Giant's Causeway, Burren, caves
 - Worth > €300 million every year

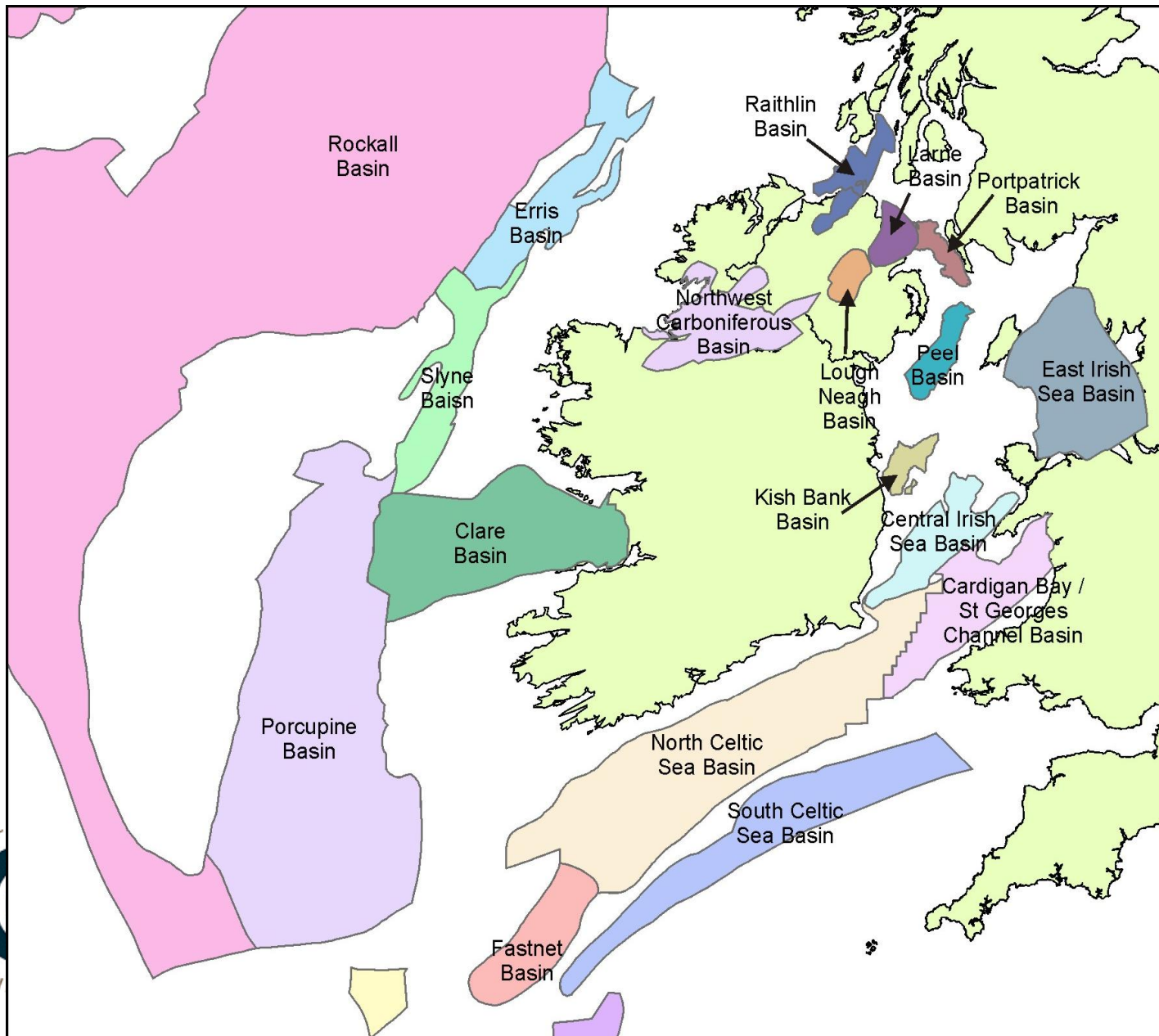


Geoscience Careers

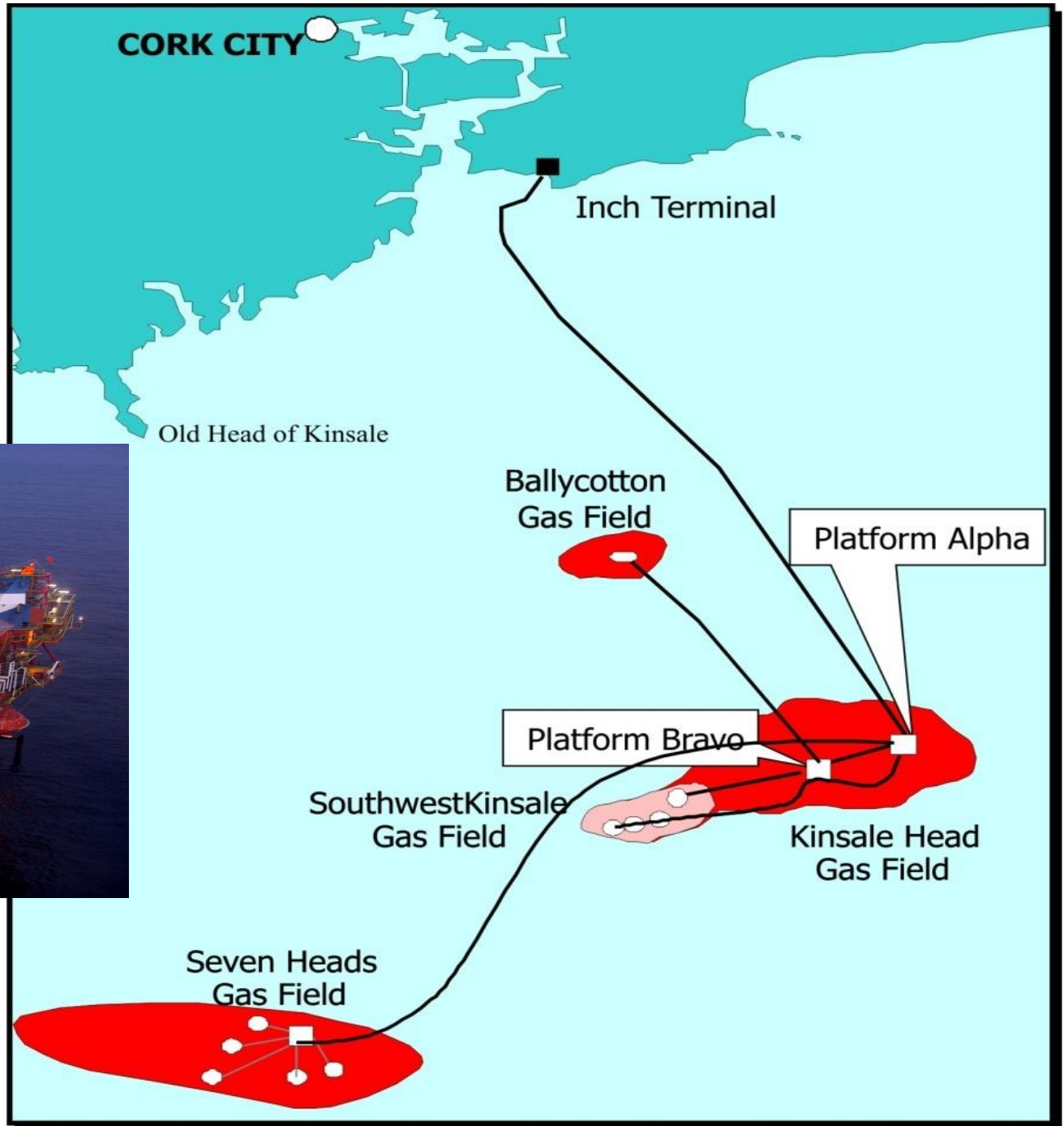
- **Petroleum Systems**
 - Offshore oil and gas exploration
 - Gas exploitation (Kinsale/ Corrib discoveries)
 - Irish National Seabed Survey
 - Petroleum Infrastructure Programme (PIP)
 - Carbon capture & storage
 - Research in universities, industry



Offshore Geoscience



Kinsale Gas Field



Geosciences

Portable Careers – Internationally

- **Resources Exploration**
 - Exploration & mining – every continent
 - Petroleum exploration & extraction
- **International Development**
 - Water resources: source, provide, management
 - Minerals management & regulation
 - Capacity building (EU, WB, UN, bilaterals)
 - Economic stimulus in rural areas



Travel Opportunities



Subsistence artisanal mining – Guinea



contributes to rural economy
13,000,000 + worldwide rely on this



Subsistence artisanal mining – Madagascar





Water scarcity – daily 2 hours walk Burkina Faso



Providing water resources to villages - Mali



Exotic climates?



Institute of Geologists in Ireland



- Represents professional geoscientists of Ireland
- Informs resources policy and public debate
- Formulates guidelines in e.g. EIA, resources
- Affiliated to European Federation of Geologists
- Reciprocal relationship with international professional bodies (UK, US, Canada, Australia etc)
- Education, conferences, training courses



Institute of Geologists in Ireland



- Education & training for schools, amateur groups
- Delighted to be associated with Seismology in Schools programme
- **Next generation of Geoscientists?**



Institute of Geologists in Ireland

Shedding light on Geosciences

For more information, contact:

Deirdre Lewis

Institute of Geologists in Ireland

SLR Consulting Ireland

dlewis@slrconsulting.com

