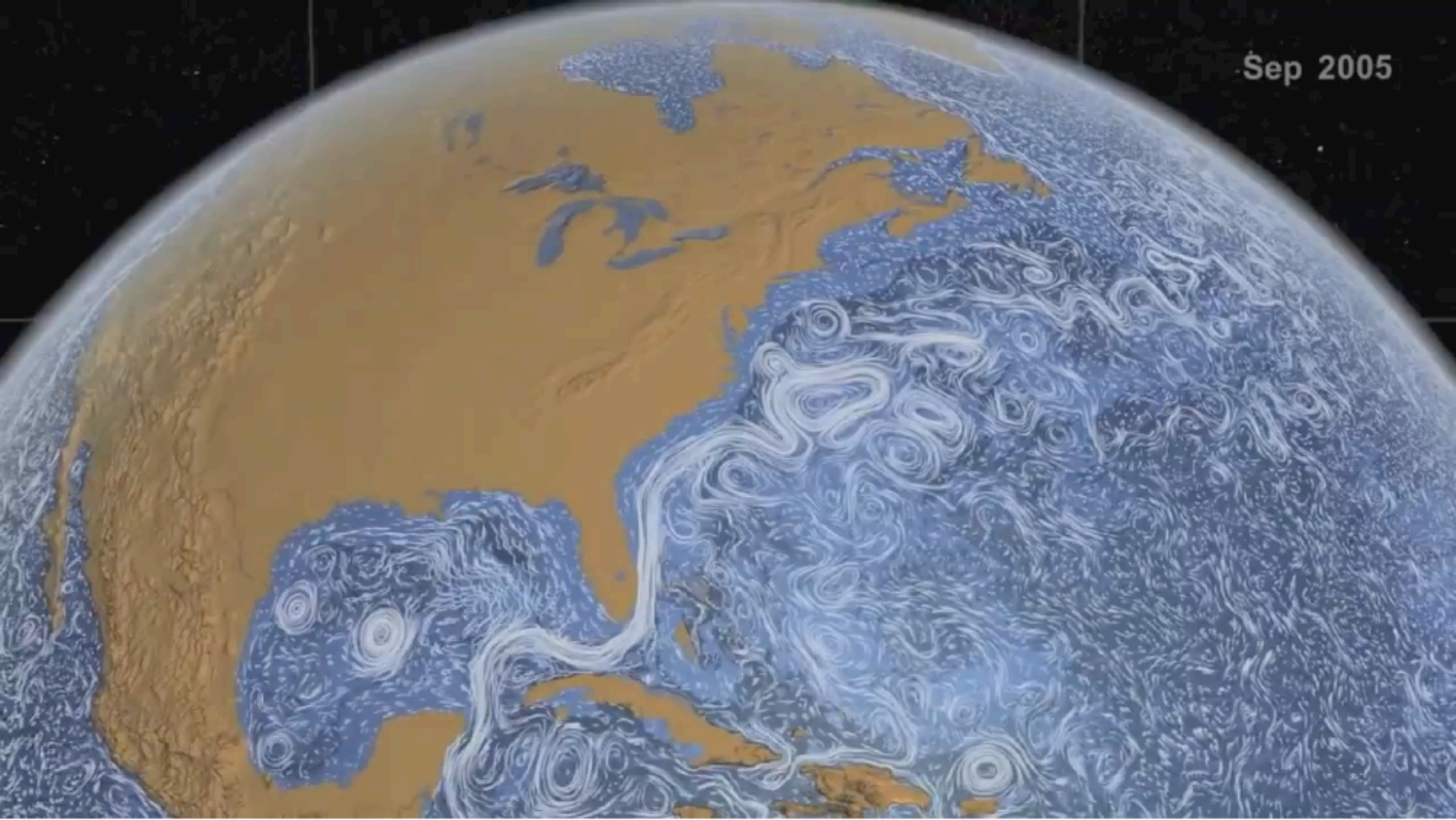
Environmental simulation modeling

This unit of study introduces approaches to **understand** and **predict behaviour of natural systems**.
It covers fundamental concepts, logic, and techniques, and develops skills in application to environmental problems.

Environmental modeling deals with representation of processes that occur in the real world in **space** and **time**. As such it focused on **spatiotemporal data analysis** and **modelling**.

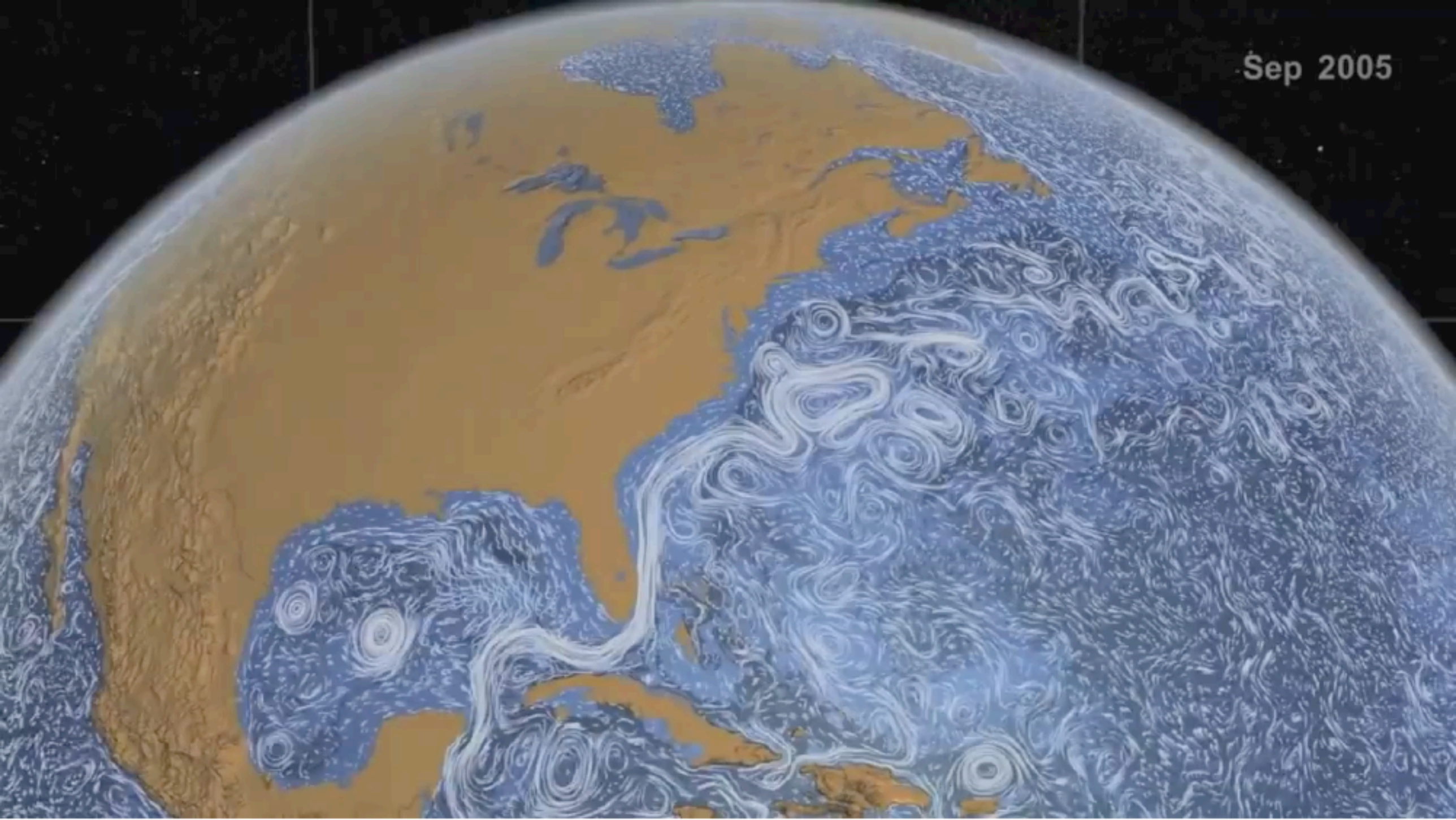

Sep 2005

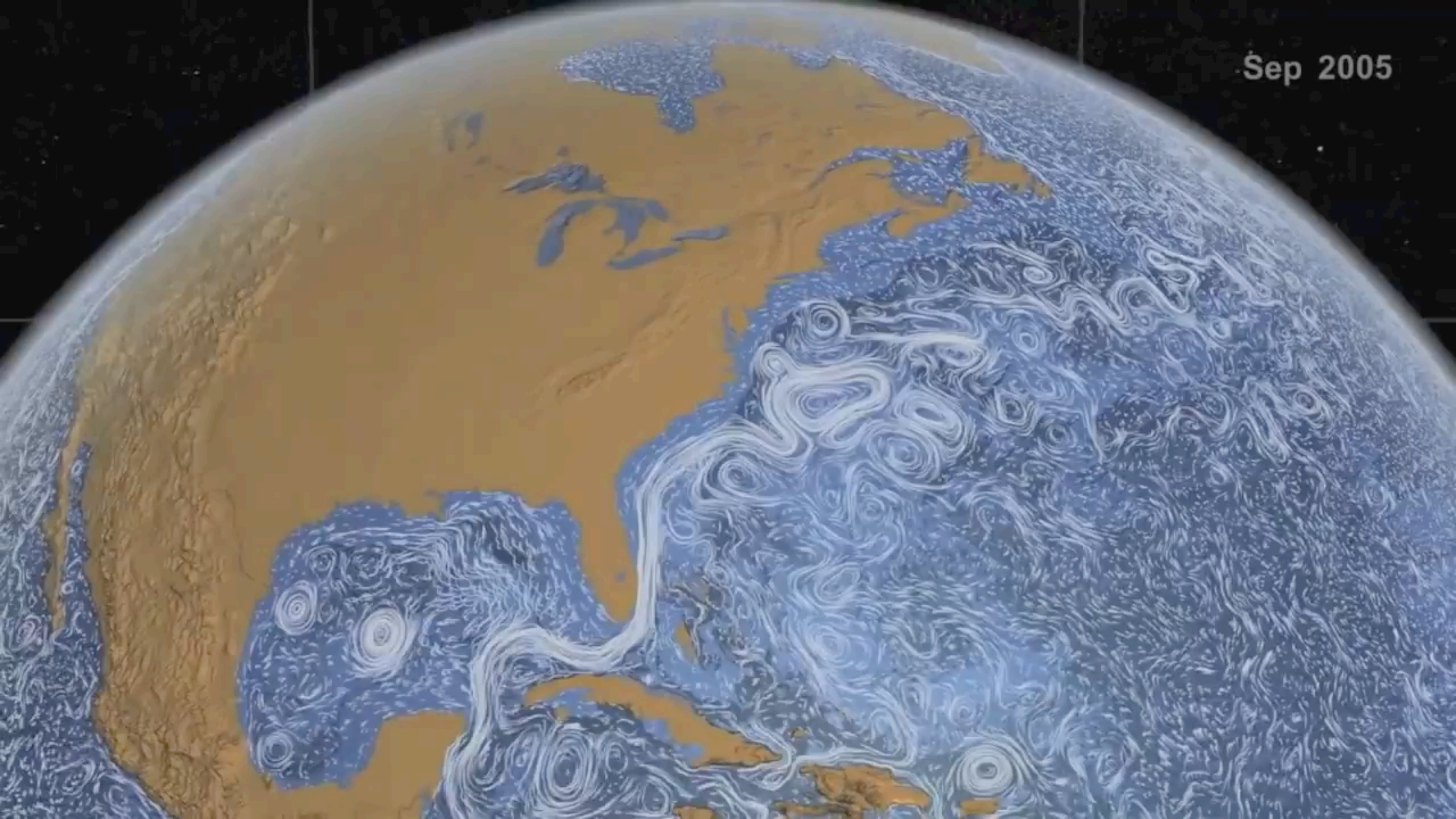
The processes that transform the environment through time are mostly described by **dynamic models** based on differential equations.

The dynamic model is compared with a **data model** which includes different information often infer from Geographic Information Systems (**GIS**). For example, ocean temperature, current, sources of pollution… These data come from national/international *monitoring programs*.

The **dynamic & data models** may be completely *separated* or may be *tightly coupled* by a software linkage that arranges for data exchange between data shared by simulation tools, and data managed by GIS.

MITgcm — *General circulation model*


Sep 2005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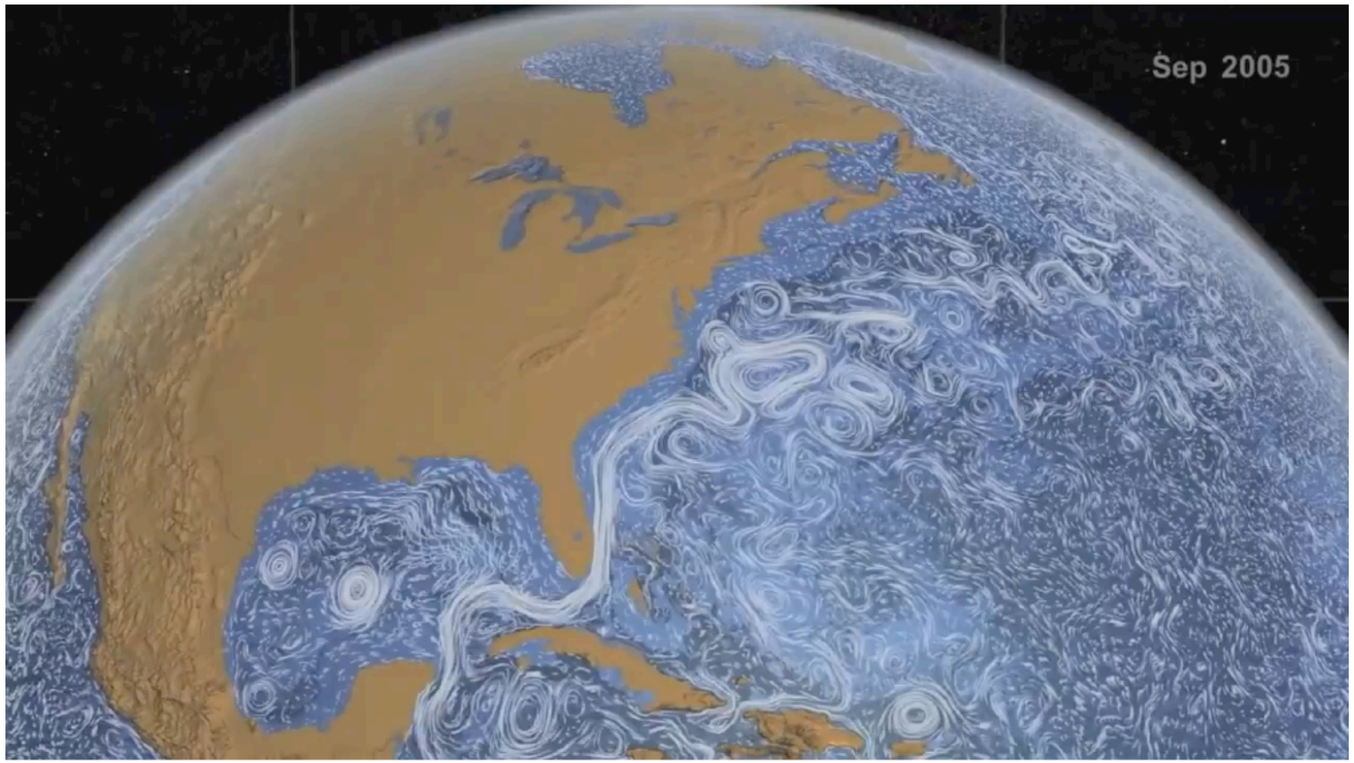

MITgcm — *General circulation model*

Environmental modelling & decision process workflow