APROXIMACIONES A LA MODELIZACIÓN Y LA PREDICCIÓN DE ECOSISTEMAS MARINOS
(Approaches to modelling and prediction of marine ecosystems)

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Why do we need oceanic ecosystem modelling?

- Spanish coastline: 4,964km, EU: 65,992.9km -> 7.5 %. (source: CIA)
- Coastal zone: Area between +/- 50m of sea level or extending landward to a distance 100km from shore. Includes coral reefs, intertidal zones, estuaries, coastal aquaculture, and seagrass communities. Roughly 68% of Spanish population living near the coast. (source: PAGE - Coastal Ecosystems, 2001)
- Economic importance (coastal tourism alone accounts for 8.5% of GIP). (source: Duarte et al. 2006. Las Ciencias y Tecnologías Marinas en España.)
OK! but, Why do we need oceanic ecosystem modelling?

- Harmful algal blooms
- Water quality, $O_2$ depletion
- Fisheries sustainability
- Aquaculture impact
- Jellyfish warning
- Ecosystem integrity
- Coastal development advice
- ...

The challenges, still there...

Dickey 1991, 2002
Son relativamente buenos!!

Blanes Bay Microbial Observatory
Blanes, relación respecto a descarga del río Tordera

![Graphs showing correlation coefficients for various parameters over time lags.](Image)
PtoS = C₀ - C₁ \cdot \text{turbulence} + C₂ \cdot \text{Phytoplankton} - C₃ \cdot (\text{Nutrients/Phytoplankton})
Fasham et al. 1990
Future? Net of remotely operated stations
• Society will demand/is demanding daily information on coastal ocean related information

• We need to move to a short term forecasting system, just like meteorology
  – e.g. What is the likelihood of having jellyfish swarms tomorrow in the Tarragona coast?
  – e.g. What is the likelihood of suffering a HAB this week in the Costa Brava “calas”?
  – The weather forecast news will cover indices of water quality just like they give UV or pollen information and advice now.
  – The interest lies in the fact that the information, even with some uncertainty, is a factual reality, not a distant inference.
  – Complex coupled physics-ecosystem models will feed on near-realtime data that will also serve multitude other operational oceanography aspects.
GRÀCIES!!