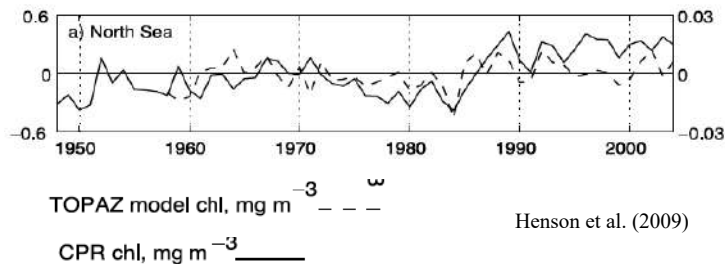


## Deep learning approaches to Elucidate phytoplankton climate induced variability

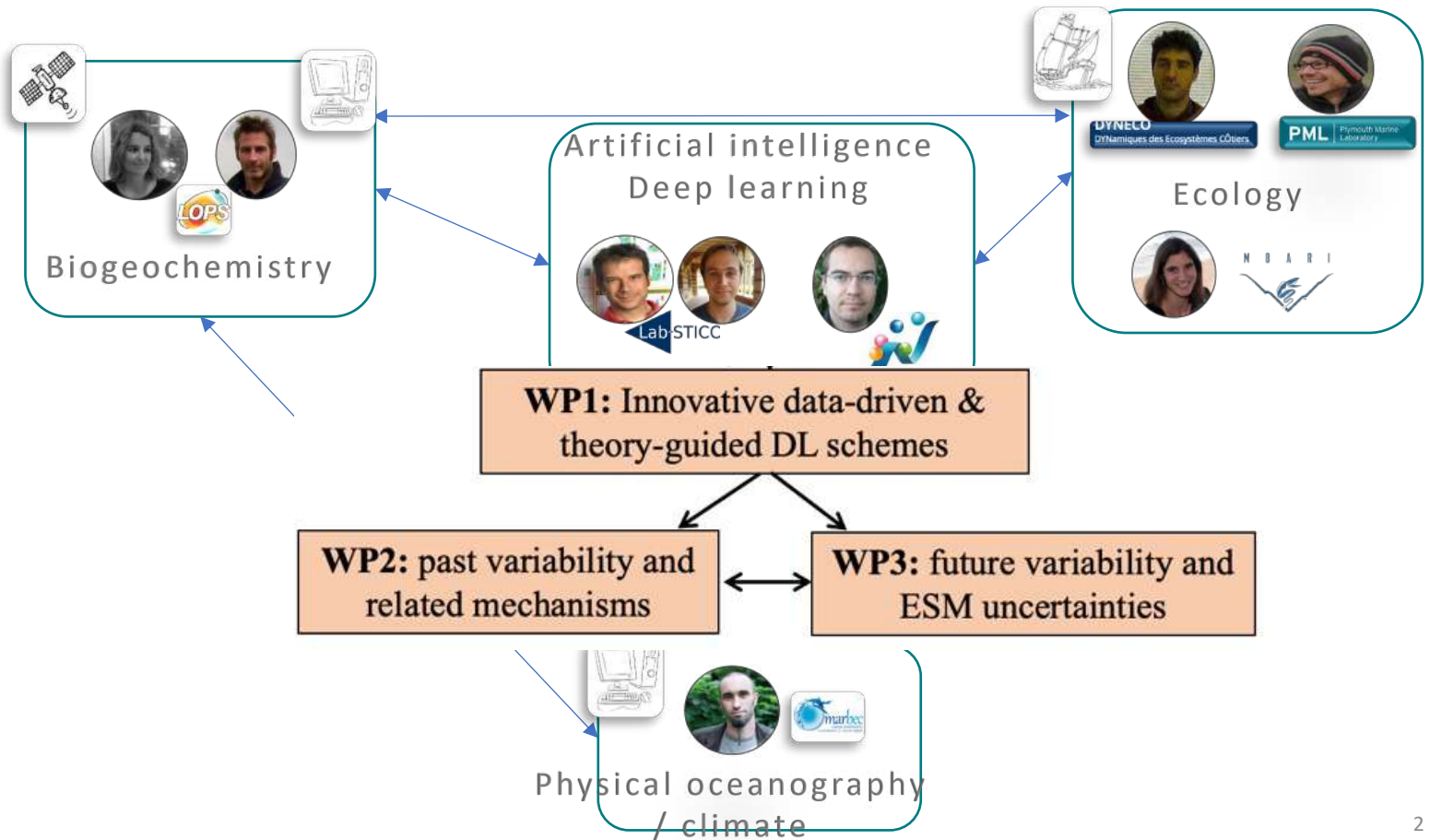
**Aim:** To deconvolve/identify the phytoplankton variability due to natural climate cycles from the anthropogenic trends

- Radiometric observations → limited in time
- In situ observations → data too sparse (and limited in time)
- Physical-biogeochemical numerical modelling
  - uncertainties in processes & model parametrization of biogeochemical parameters



Difficulties to solve regime shift

# Deep learning approaches to Elucidate phytoplankton climate induced variability



## Deep learning approaches to Elucidate phytoplankton climate induced variability

**WP1 Improving the deep learning architectures through several emulators:**

Data-driven:  $Y = f(X)$ .  $Y = \text{Chl}$ ,  $X = \text{predictors}$

ODE/PDE:  $\partial_t Y = f(\partial_t X)$ . ;  $\partial_t Y = f(\partial_t X, \partial_t Y) \dots$

**WP2 Investigate Chl & PFT low-frequency variability & anthropogenic trends and related physical processes at global scale**

From radiometric obs. past multi-decadal reconstruction at global scale.

**WP2bis Elucidating abiotic and phyto-zooplankton inter-specific relationships at regional scale (an possibly global)**

From in situ obs. in contrasted BGC environment: HOT, Californian upwelling, North Atl.

**WP3 Assessing phytoplankton response to future climate changes and related uncertainties**

From ESM.