# Marine phytoplankton : a bioindicator of ecosystem change

Phytoplankton are changing rapidly in response to fluctuations in nutrient input in marine systems :

▶ They are excellent indicators of marine ecosystem change;

▶ They are promoted by various organizations (*e.g.* European Commission) as a tool for biomonitoring and assessing the impact of anthropogenic pressures on the ecosystem.

A BOUQUET OF PHYTOPLANKTON
Micrographs reveal phytoplankton's structural diversity and beauty.
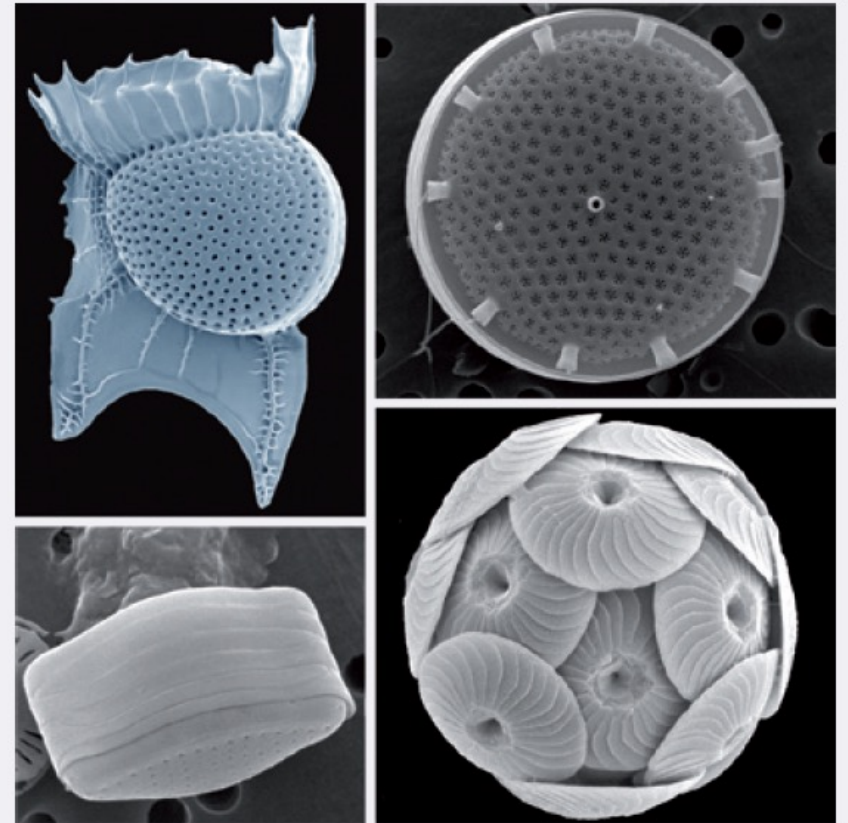
Falkowsky 2012

≫ **Need for indicators**

Phytoplankton indicators : focus on composition

▶ **Most indicators of phytoplankton composition are NOT operational (wide range of scientific instruments needed, high level of expertise required, high effort in time and cost, …) OR do not respond to pressure.**

$PPCI_{Med}$ is a new indicator of phytoplankton composition:

- **It uses diagnostic pigments of total phytoplankton measured by HPLC. Only pigments responding positively to pressure (*i.e.* nutrient concentrations) are considered,**

$PPCI_{Med} =$

$(SI_{Peridinin} + SI_{Fucoxanthin} + SI_{Prasinoxanthin} + SI_{Alloxanthin}) / 4$

▼ | ▼ | ▼ | ▼

Dinoflagellates   Diatoms   Prasinophytes   Cryptophytes

- **It is designed to be scientifically robust yet easy to implement by stakeholders lacking expertise in phytoplankton taxonomy,**

- **It is applicable to different marine systems.**

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Applications of PPCI$_{Med}$

▶ **You need :**

- **To select pigments responding positively to pressures in your area,**

- **To collect data in reference sites and impacted water masses.**

The calculation protocol, the evaluation grid and examples are presented on the poster.

▶ **Field of application:**

- **WFD,**

- **Impact of anthropogenic disturbances (*e.g.* aquaculture, recreational boating, …) on water quality,**

- **Monitoring the progress of restoration efforts, …**

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