EARLY-ADAPT

Quantile machine learning models for predicting European-wide, high resolution Aerosol Optical Depth (AOD) and its fraction predictions based on ground-based AERONET data

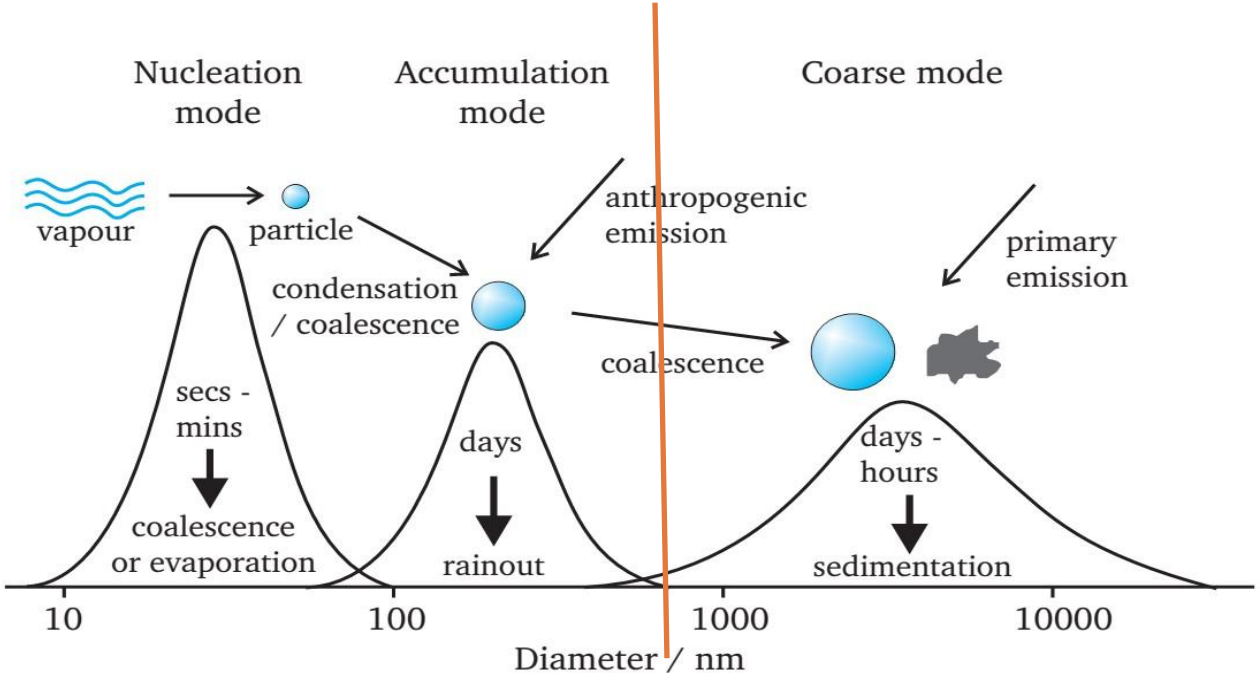
Zhao-Yue Chen
ISGLOBAL, UPF
EGU22,
24 May 2022

EXCELENCIA SEVERO OCHOA

GOBIERNO DE ESPAÑA
MINISTERIO DE CIENCIA E INNOVACIÓN

European Research Council
Established by the European Commission

why seperate AOD to fine mode and coarse mode data ？

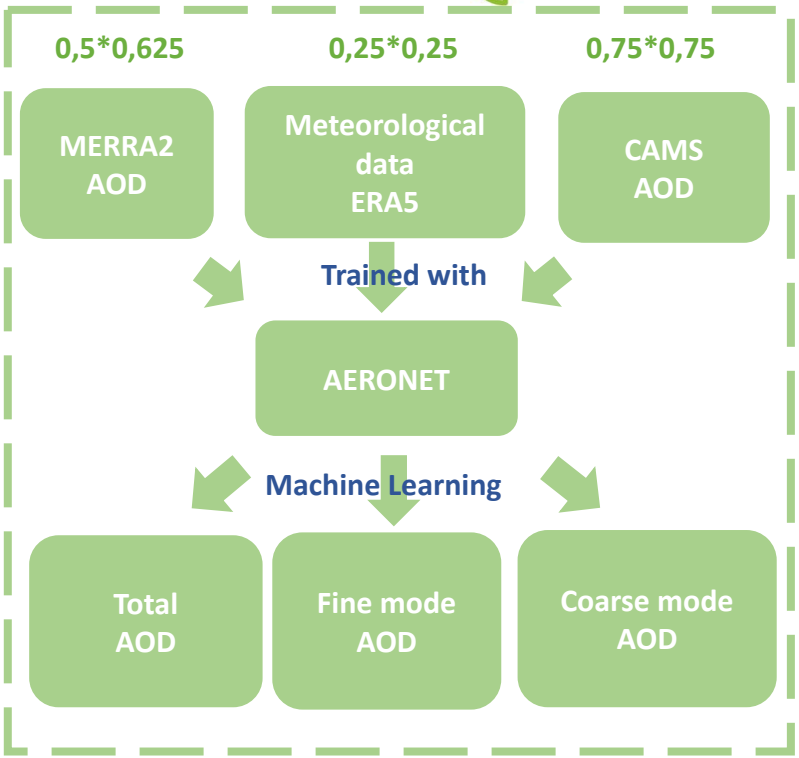


- pollution control evaluation
- Health assessment

what is the problem of existing AOD data (Reanalysis or Remote sensing) ?

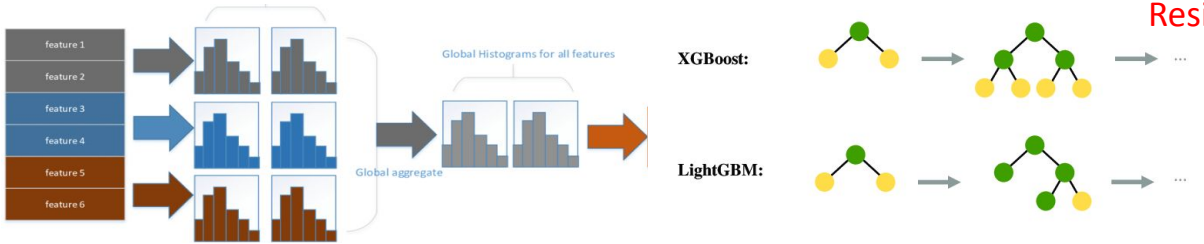
Main Gaps:

- High missing of Satellite infos
- Uncertainty against AERONet
- Reanalysis data lacks of fraction infos
- Unstable correlation between PMs

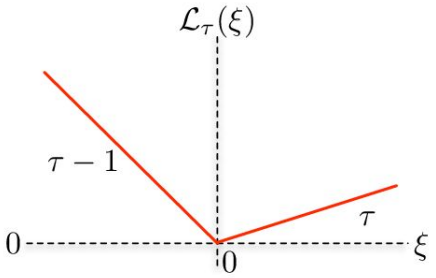


Quantile machine learning

- LightGBM (Faster and less memory)



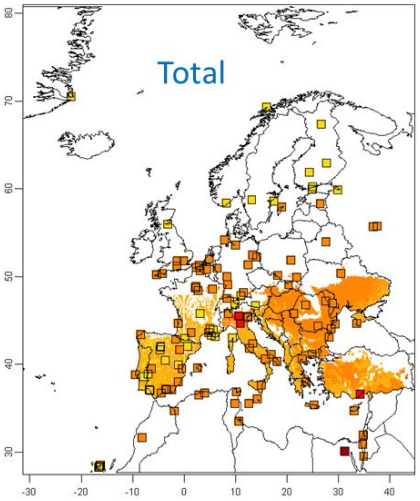
- pinball loss function (estimate different quantile)

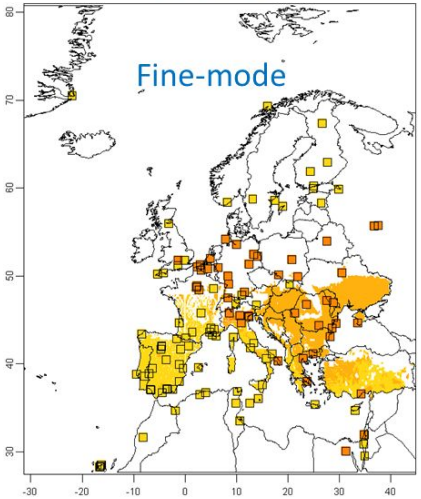


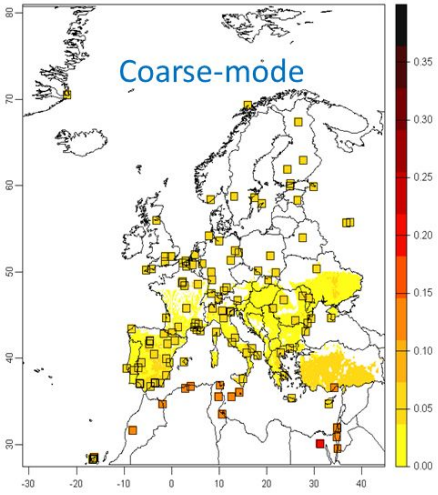
- Provide median predictions and prediction uncertainty (90% CI or prediction errors)

erc
European Research Council
Established by the European Commission

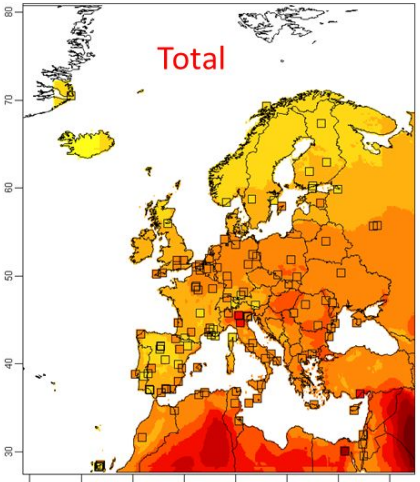
Satellite

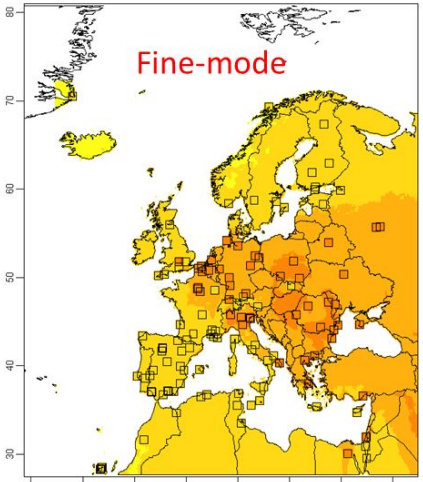


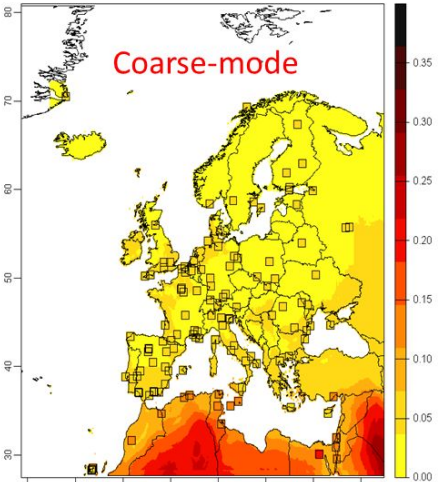




New Method



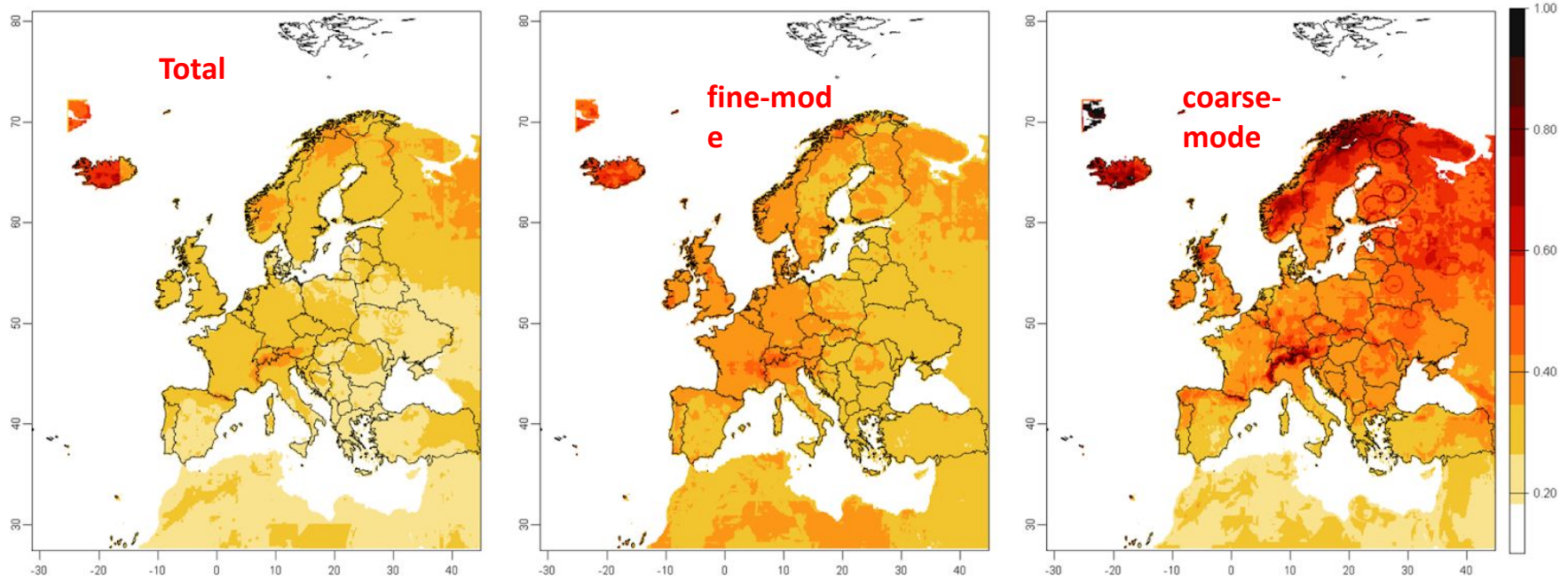




2003-2020 average (Square point:Ground sites)

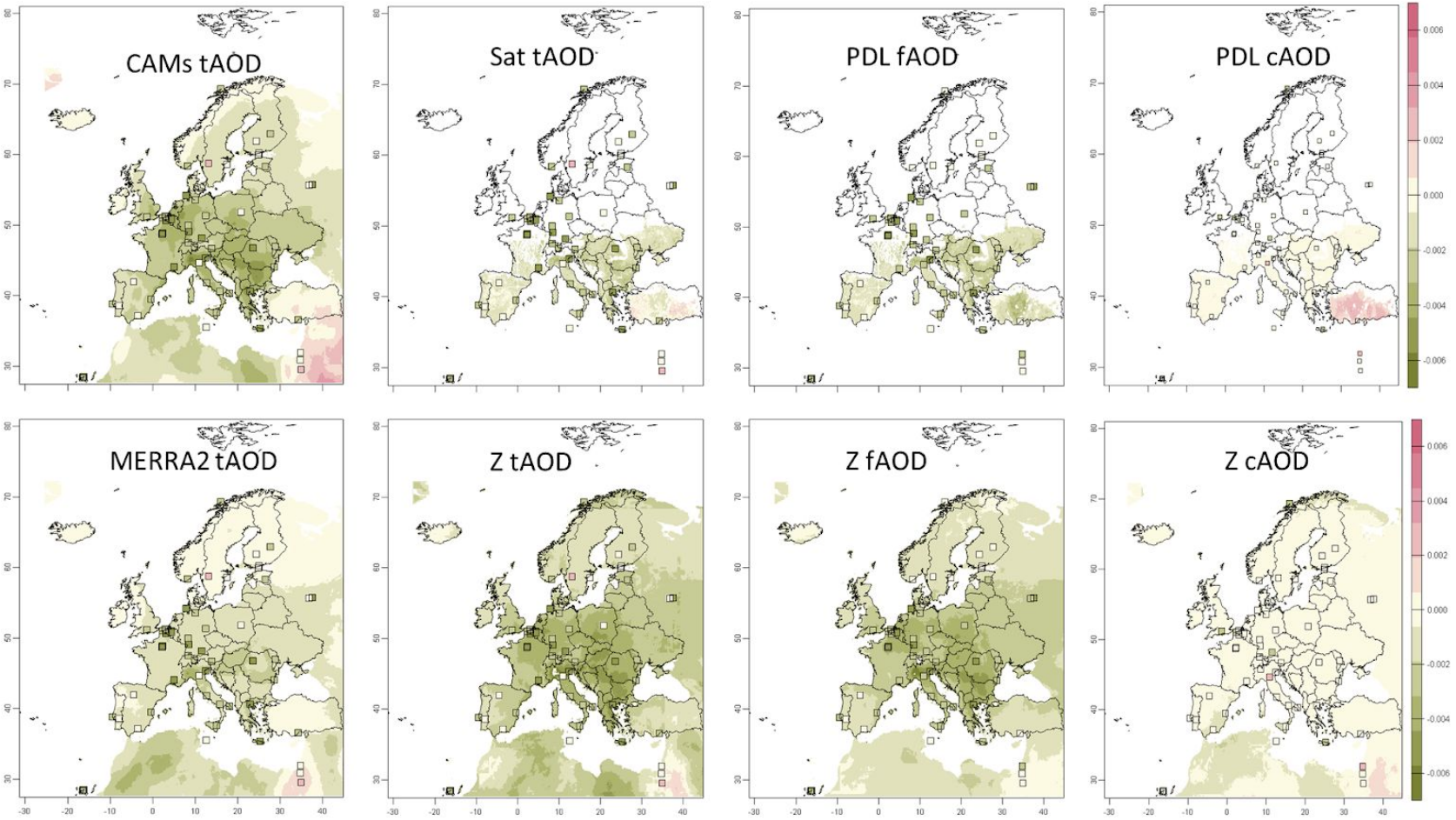
European Research Council
Established by the European Commission

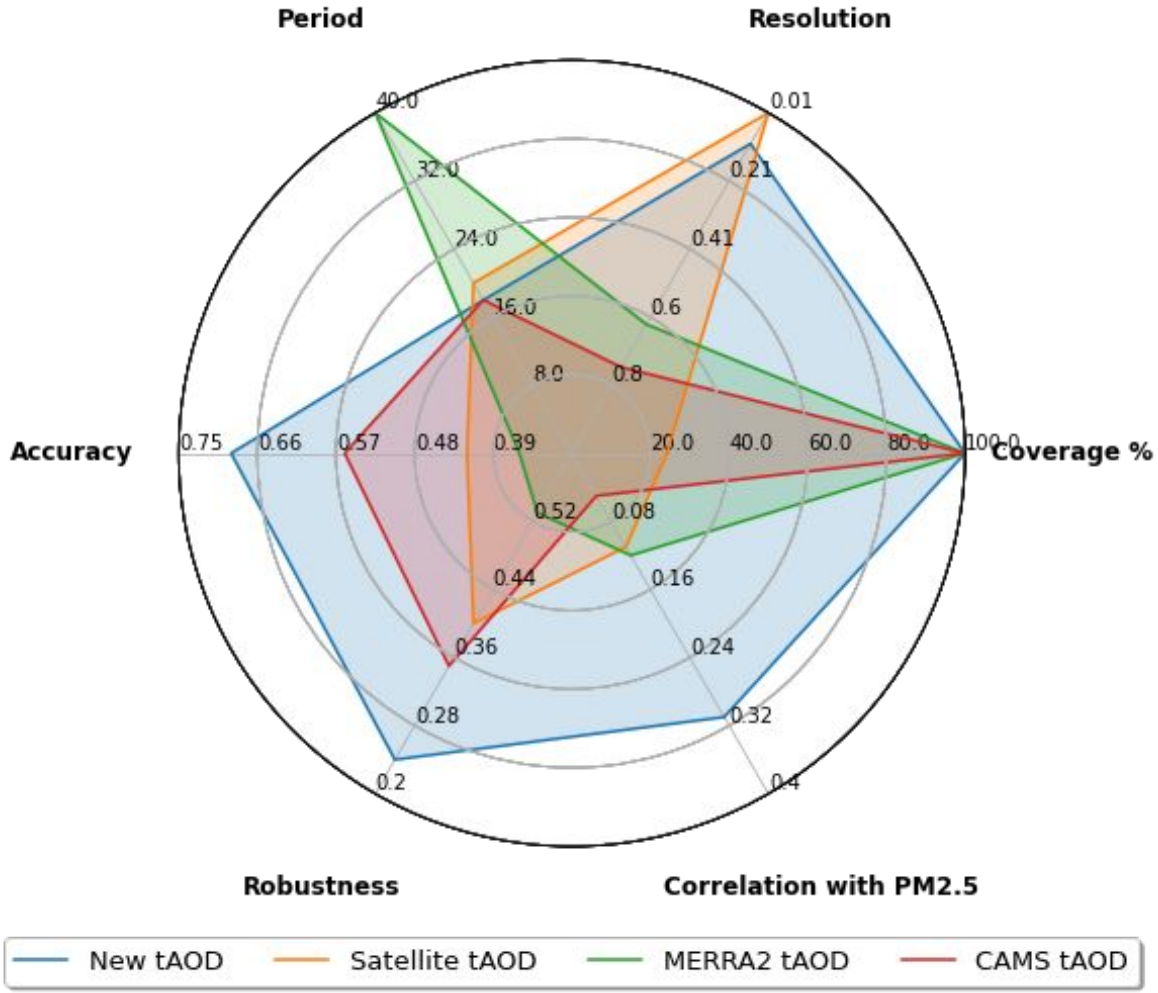
Prediction uncertainty (SE/Mean)



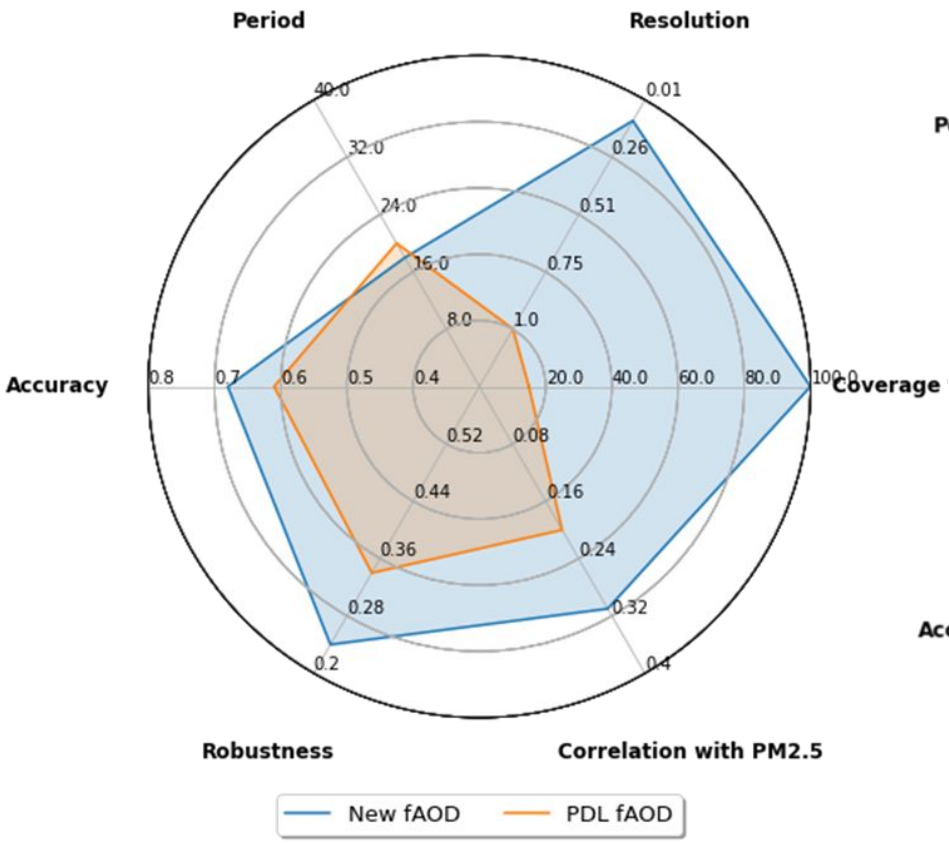
European Research Council
Established by the European Commission

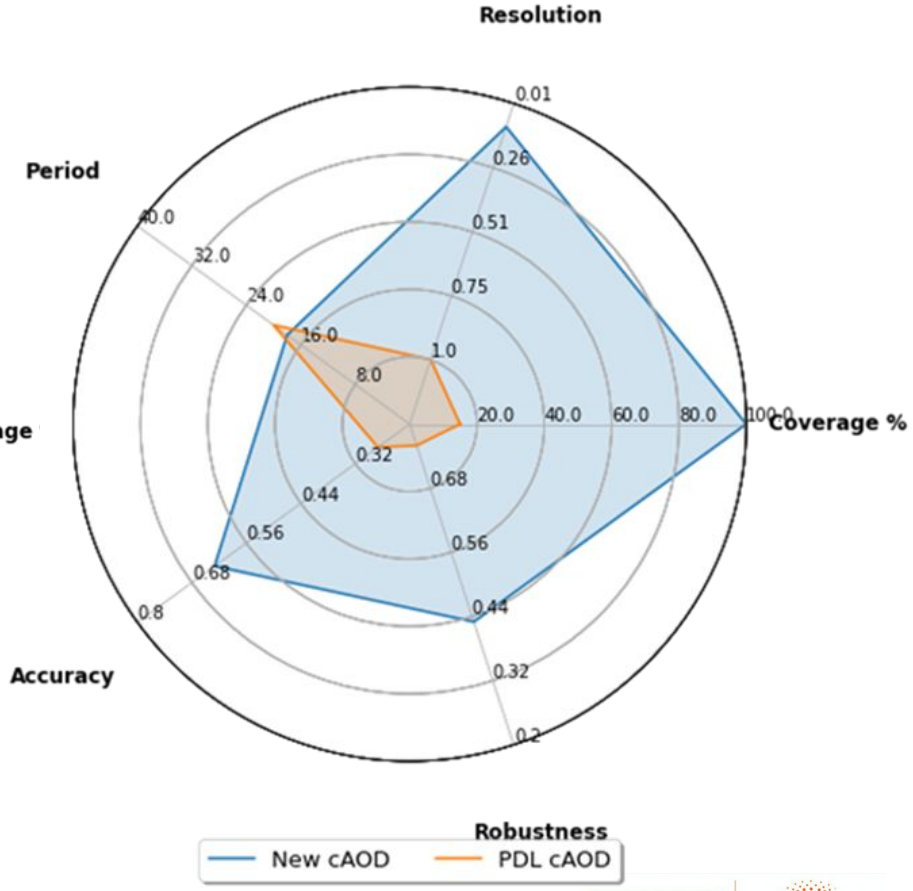
2003-2020 Trend for AOD product :





European Research Council
Established by the European Commission





European Research Council
Established by the European Commission

EARLY-ADAPT

THANK YOU FOR YOUR ATTENTION!

Early-adapt website: www.early-adapt.eu

EXCELENCIA SEVERO OCHOA

GOBIERNO DE ESPAÑA
MINISTERIO DE CIENCIA E INNOVACIÓN

The EARLY-ADAPT project has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (Grant agreement No. 865564)

European Research Council
Established by the European Commission