# BCC Feedback for CMIP6 experiments

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# BCC Models for CMIP5

| Model versions | Model components | Resolutions |
|---|---|---|
| BCC-CSM1.1 | BCC-AGCM2.1<br>BCC-AVIM1<br>MOM4-L40v1<br>SIS | Atmos: T42L26, Top: 2.19 hPa<br>Ocn: $1/3^o$ in 30S-30N and $1/3\text{-}1^o$ in 30-60 N/S, and 1o in high latitudes |
| BCC-CSM1.1(m) | BCC-AGCM2.2<br>BCC-AVIM1<br>MOM4-L40v2<br>SIS | Atmos: T106L26, Top: 2.19 hPa<br>Ocn: $1/3^o$ in 30S-30N and $1/3\text{-}1^o$ in 50-60N/S, and 1o in high latitudes |

# BCC Models for CMIP6

| Model Versions | Model Components | Resolutions |
|---|---|---|
| **BCC-ESM1-LR (BCC-ESM1-MR)** | BCC-AGCM3-Chem<br>BCC-AVIM2<br>MOM4-HAMOCC<br>CICE5 | Atmos: T42L40, Top: 0.3 hPa<br>Ocn: $1/3^o$ in 50S-50N and $1/3\text{-}1^o$ in 50N-60N, and $1^o$ in high latitudes |
| **BCC-CSM2-MR** | BCC-AGCM3-MR<br>BCC-AVIM2<br>MOM4-HAMOCC<br>CICE5 | Atmos: T106L40, Top: 0.3 hPa<br>Ocn: $1/3^o$ in 50S-50N and $1/3\text{-}1^o$ in 50N-60N, and $1^o$ in high latitudes |
| **BCC-CSM2-HR** | BCC-AGCM3-HR<br>BCC-AVIM2<br>MOM4-HAMOCC<br>CICE5 | Atmos: T266L40, Top: 0.3 hPa<br>Ocn: $1/3^o$ in 50S-50N and $1/3\text{-}1^o$ in 50N-60N, and $1^o$ in high latitudes |

**Feedback form by BCC group**

1. **Overarching Questions**

 a) What is the expected resolution(s) of your CMIP6 model(s)? (Atmosphere? Ocean?)

 Atmosphere-T42L40    (for AerChemMIP),

 -T266L40  (for HDDEX and HighResMIP), and

 -T106L40  (for DECK and others MIPs) .

 Ocean        - $1/3°$ in 50S-50N and $1/3-1°$ in 50N-60N, and $1°$ in high latitudes.

 b) Do you aim to run different configurations (e.g. ESM, physical, etc) of your model(s)?

 Yes.

 c) Based on your estimate of how much computing you expect to be available to you
 for CMIP6, how many total model years of these model(s) do you think you can run?"

 ~ 15000 years.

 d) Who is the main point of contact for the model?

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2. **CMIP6 DESIGN**

 **WE** prefer  (a).

 (a)  no further prioritization beyond the DECK so that modelling groups choose from the
 MIP experiments (that are prioritized in Tiers for some MIPs) entirely based on their
 scientific interest as proposed in Meehl et al., EOS, 2014

- **DECK and NUCLEUS 6**
- **Other MIPs that BCC will contribute simulations to**

| | Short name of MIP | Long name of MIP | BCC China |
|---|---|---|---|
| 1 | AerChemMIP | Aerosols and Chemistry Model Intercomparison Project | 1 |
| 2 | C4MIP | Coupled Climate Carbon Cycle Model Intercomparison Project | 1 |
| 3 | CFMIP | Cloud Feedback Model Intercomparison Project | 1 |
| 4 | DAMIP | Detection and Attribution Model Intercomparison Project | 1 |
| 5 | DCPP | Decadal Climate Prediction Project | 1 |
| 6 | FAFMIP | Flux-Anomaly-Forced Model Intercomparison Project | 0 |
| 7 | GDDEX | Global Dynamical Downscaling Experiment | 1 |
| 8 | GeoMIP | Geoengineering Model Intercomparison Project | 0 |
| 9 | GMMIP | Global Monsoons Model Intercomparison Project | 1 |
| 10 | HighResMIP | High Resolution Model Intercomparison Project | 1 |
| 11 | ISMIP6 | Ice Sheet Model Intercomparison Project for CMIP6 | 0 |
| 12 | JCOMM* | Coordinated Ocean Wave Climate Project | 0 |
| 13 | LS3MIP | Land Surface, Snow and Soil Moisture | 1 |
| 14 | LUMIP | Land-Use Model Intercomparison Project | 1 |
| 15 | nonlinMIP | Non-linear Model Intercomparison Project | 2 |
| 16 | OCMIP6 | Ocean Carbon Cycle Model Intercomparison Project, Phase 6 | 1 |
| 17 | PDRIP | Precipitation Driver and Response Model Intercomparison Project | 0 |
| 18 | PMIP | Palaeoclimate Modelling Intercomparison Project | 0 |
| 19 | RFMIP | Radiative Forcing Model Intercomparison Project | 1 |
| 20 | ScenarioMIP** | Scenario Model Intercomparison Project | 1 |
| 21 | SensMIP | Sensitivity Model Intercomparison Project | 2 |
| 22 | VolMIP | Volcanic Forcings Model Intercomparison Project | 2 |

BCC-ESM1-LR
(T42L40)

BCC-ESM1-MR
(T106L40)

BCC-CSM2-MR
(T106L40)

BCC-CSM2-HR
(T266L40)

0: do not plan to contribute simulations

1: plan to contribute simulations

2: Not sure yet

**BCC has been established BCC-GODAS based on BCC-CSM2.0-MR for S2S and seasonal predictions**

## Characteristics of S2S forecast systems

|  | Time-range | Resolution | Top Level | Freq. | Ens. Size |
|---|---|---|---|---|---|
| ECMWF | D 0-32 | T639/319L62 | ~0.5 hPa | 2/week | 51 |
| UKMO | D 0-60 | N96L85 | ~0.25 hPa | daily | 3 |
| NCEP | D 0-60 | N126L64 | ~0.2hPa | daily | 4 |
| EC | D 0-35 | 0.6×0.6L40 | ~2hPa | weekly | 4 |
| CAWCR | D 0-120 | T47L17 | ~10hPa | weekly | 33 |
| JMA | D 0-34 | T159L60 | ~0.1 hPa | weekly | 5 |
| KMA | D 0-30 | T106L21 | ~10hPa | 3/month | 20 |
| Meteo-France | D 0-60 | T127L31 | ? | monthly | 51 |
| CMA | D 0-60 | T106L40 | 0.3hPa | daily | 4 |

BCC-CSM2.0-MR

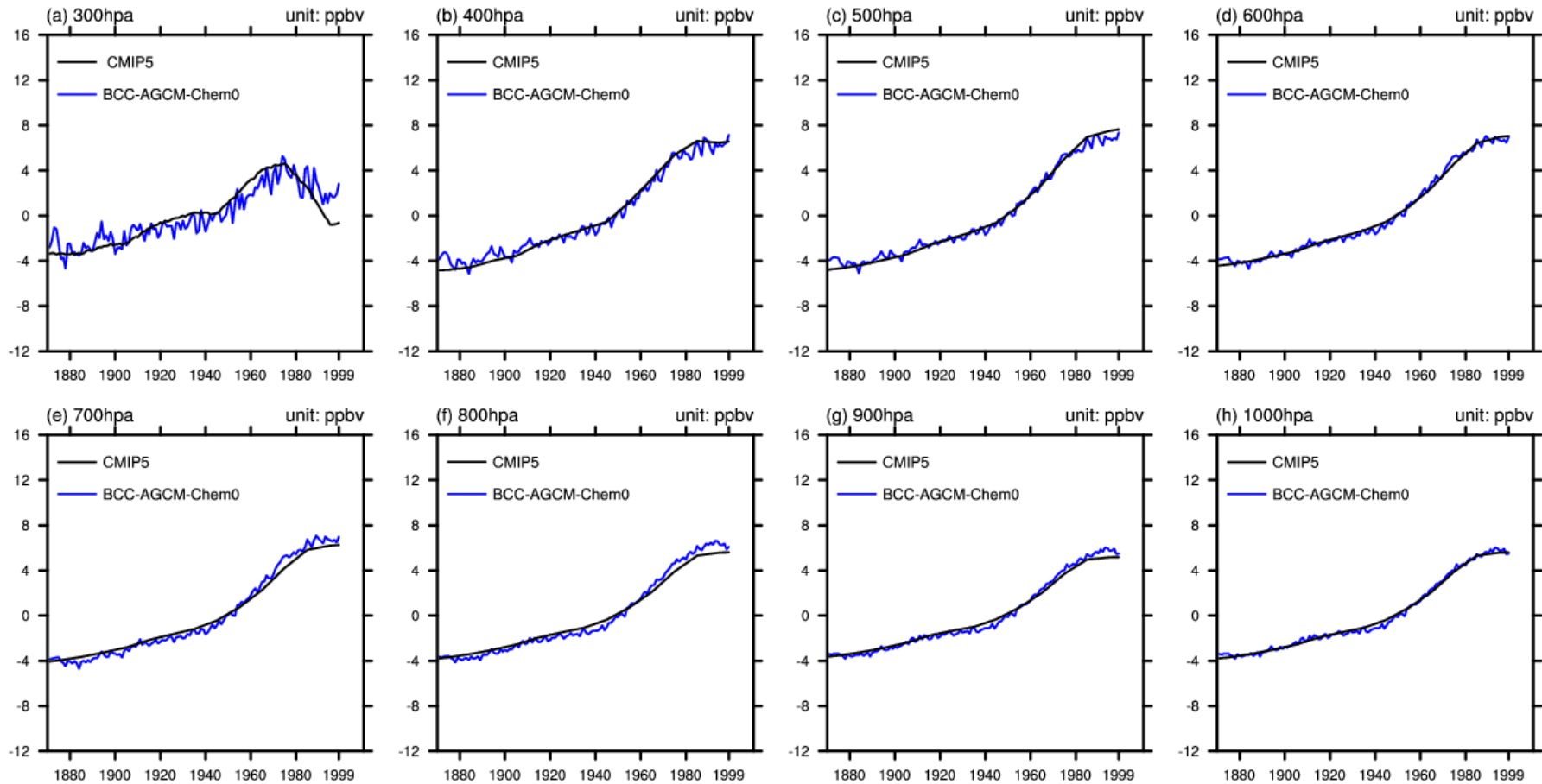**BCC-AGCM-Chem1 =BCC-AGCM2.1 + MOZART (63 tracers) + CO2 + 12 Aerosols**

Note: the CO2 fluxes at sea surface are the ensemble from 7 CMIP5 esmHistorical simulations
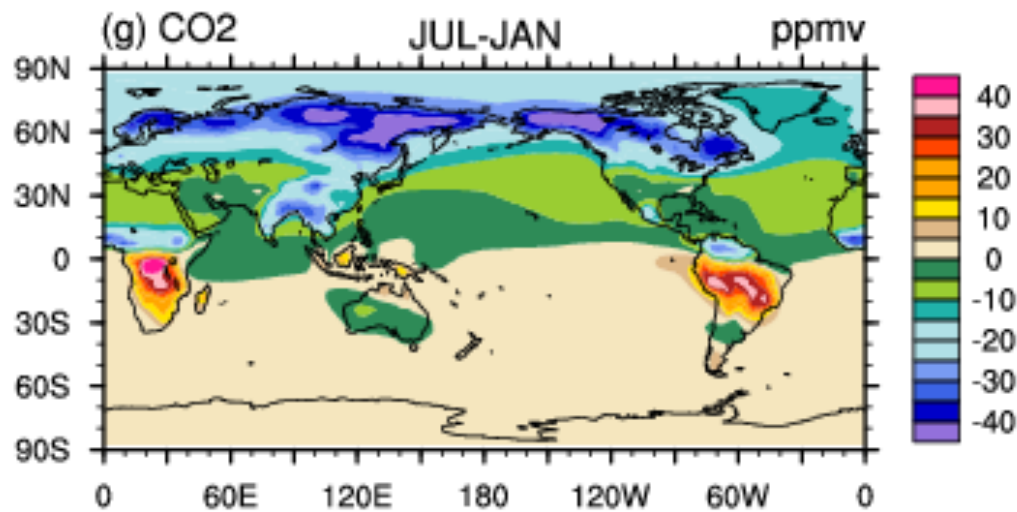


Global mean CO2 near the surface
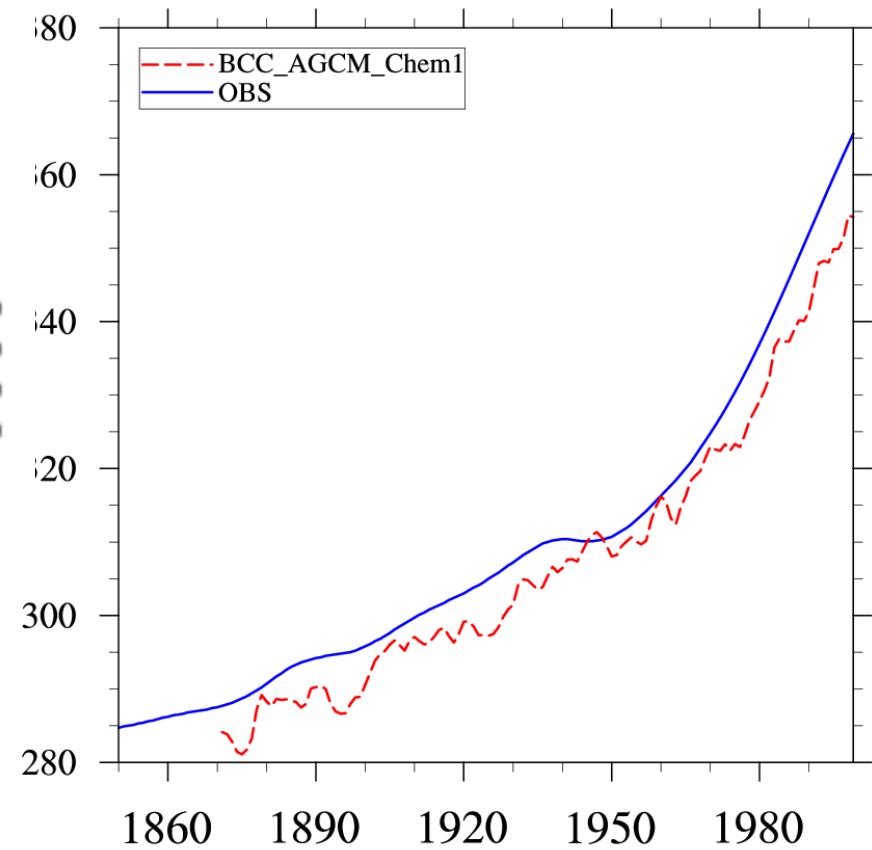
# Global-averaged mean O3 in 1871-1999 from BCC-AGCM-Chem0
## (using historical ozone precursor emissions)

## CMIP6 Timeline

2014   2015   2016   2017   2018   2019   2020   ...

Frozen BCC-ESM1-LR →  run AerChemMIP , C4MIP

Frozen BCC-CSM2-MR →  run DECK and most of other MIPs

Frozen BCC-CSM2-HR →  run GDDEX and HighResMIP