Categorisation of ESMValTool recipes

Recipe	**description**	**model diversity**			**simulation diversity**		**comparison**	**optimized for**
		single model	plural model seperate diagnostics	multi model combined diagnostics	single member	multi member	e.g. with observation or reanalysis	
recipe_arctic_ocean.yml dkrz	- evaluation of ocean components - aim model comparison to climatological data		x historical		x		PHC3	CMIP5
recipe_heat waves_cold waves.yml dkrz	- estimate relative change in heat/cold wave characteristics in future climates - compared to reference period	x			x		with historical or piControl	
recipe_esacci_oc.yml dkrz	- compares monthly surface chlorophyll (CMIP) to ESA CCI colour chlorophyll		x historical		x		ESACCI-OC	CMIP6
recipe_monitor.yml dkrz	- plotting arbitrary variables	x			x		-	
recipe_cmug_h2o.yml dkrz	Diagnositcs for ESACCI data, which evaluate water vapor short wave radiance absorption schemes, water vapour profiles,			x piControl abrupt4xCO2 historical			CERES-EBAF (obs4MIPs)	CMIP5 CMIP6

	and climatologies at the tropopause						ESACCI-WATERVAPOUR (OBS) ERA-Interim (OBS6)	
recipe_clouds_bias.yml recipe_clouds_ipcc.yml recipe_lauer13jclim.yml dkrz	- evaluate cloud climatologies from CMIP models - creates map plots of multi-model mean etc.			x historical			GPCP-SG (obs4MIPs) MODIS (obs4MIPs)	
recipe_williams09climdyn_CREM.yml dkrz	Cloud Regime Error Metric (CREM)		?				ISCCP ISCCP-FD MODIS ERBE	
recipe_consecdrydays.yml dkrz	calculates - longest period of consecutive dry days - frequency of dry periods	x historical			x		-	
recipe_diurnal_temperature_index.yml dkrz	Diurnal temperature indicator (DTR)	x rcp			x		historical	

recipe_eady_growth_rate.yml dkrz	- maximum Eady Growth Rate - annual and seasonal means -> plot for North-Atlantic	x highresSST-present			x			
recipe_eyring06jgr.yml dkrz	Diagnostics of stratospheric dynamics and chemistry - Vertical profile climatological mean bias - ozone anomalies			x historical	x		ERA-Interim (OBS6) HALOE (OBS) NIWA-BS (OBS)	CMIP5
recipe_gier20bg.yml dkrz	evaluates ESMs (using satellite CO_2 data) - plots timeseries, - seasonal cycle - growth rate			x esm-hist		x	CDS-XCO2 GISTEMP ESRL	CMIP5 & 6
recipe_hyint.yml dkrz	evaluating the 6 hydroclimatic indices, performing trend analysis and plotting			? [historical, rcp85]			no observations	CMIP5
recipe_modes_of_variability.yml dkrz	compute RMSE (root mean square error) between observed and modelled patterns of variability	x rcp85			x		historical	CMIP5
recipe_mpqb_xch4.yml dkrz	comparison of atmospheric methane between CMIP6 models and observations		x historical ssp585 ssp245		x		CDS-XCH4	CMIP6

recipe_quantilebias.yml dkrz	Precipitation quantile bias	x historical			x		GPCP-SG (obs4MIPs)	CMIP5
recipe_autoassess_stratosphere.yml dkrz	Stratosphere - Autoassess diagnostics - Polar night jet / easterly jet strengths - Extratropical temperature at 50hPa - Quasi-Biennial Oscillation (QBO)		x amip		x		ERA-Interim (OBS6)	CMIP5
recipe_autoassess_landsurface_permafrost.yml dkrz	Land-surface Permafrost - Autoassess diagnostics	x			x		- (possible to incl. obs.)	CMIP5
recipe_autoassess_landsurface_surfrad.yml dkrz	Land-surface Surface Radiation - Autoassess diagnostics	x			x		CERES-EBAF	CMIP5
recipe_autoassess_landsurface_soilmoisture.yml	Land-surface Soil Moisture - Autoassess diagnostics - median absolute error (model minus observations)	x			x		- (possible to incl. obs.)	CMIP6

	- Normalised assessment metrics plot							
recipe_zmnam.yml dkrz	- evaluates the representation of Annular Modes, using reanalysis datasets as reference - zonal mean algorithm	x amip			x		-	CMIP5
recipe_thermodyn_diagtool.yml dkrz	diagnostics for thermodynamic aspects			x historical	x		-	CMIP5&6
recipe_landcover.yml dkrz	Landcover diagnostics - accumulated and fractional extent of major land cover classes - global and regional - compared to ESA-CCI land cover data	x rcp85			x		ESACCI-LANDCOVER	CMIP5
recipe_hydro_forcing.yml dkrz	Hydro forcing comparison - assess agreement btw. forcing datasets - plot timeseries raw daily data - plot monthly aggregated data - plot monthly climate statistics	x historical			x		ERA-Interim ERA5	native6
recipe_albedolandcover.yml dkrz	Landcover - Albedo - analyzes the relationship between landcover and albedo	x historical			x		Duveiller2018	CMIP5&6

recipe_carvalhais14nat.yml dkrz	Turnover time of carbon over land ecosystems - Comparisons of global distributions of tau_ctotal from all models against observation and other models - Variation of tau_ctotal across latitude (zonal distributions) - Variation of association of tau_ctotal and climate across latitude (zonal correlations) - metrics of global tau_ctotal and correlations			x historical	x		carvalhais14nat	
recipe_anav13jclim.yml dkrz	Land and ocean components of the global carbon cycle plots for different regions: - timeseries - seasonal cycle - errorbar (mean & standard deviation) - scatterplot, mean vs. interannual variability ect. - ect.			x historical	x		CRU (OBS)	CMIP5
recipe_runoff_et.yml dkrz	Runoff and Evapotranspiration Diagnostics calculates water balance components for diff. catchments	x historical			x		zenodo catchmentmask	CMIP5

recipe_cvdp.yml dkrz	Climate Variability Diagnostics Package (CVDP) documents the major modes of climate variability in models and observations		x historical		x		?	CMIP5
	ocean diagnostics							
recipe_russell18jgr.yml dkrz	southern ocean metrics - assess multiple simulations to obs. -		x historical		x		?	CMIP5&6