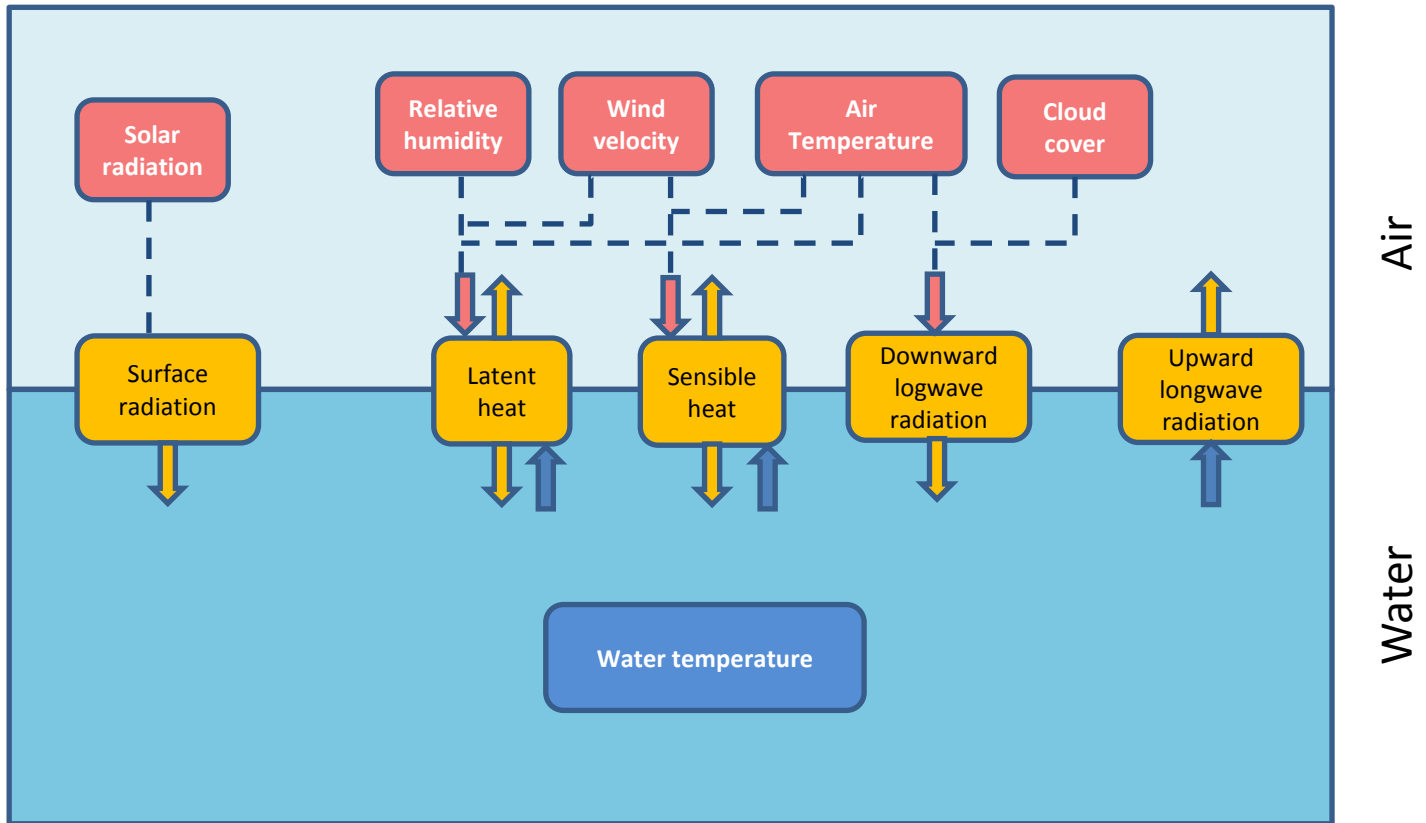


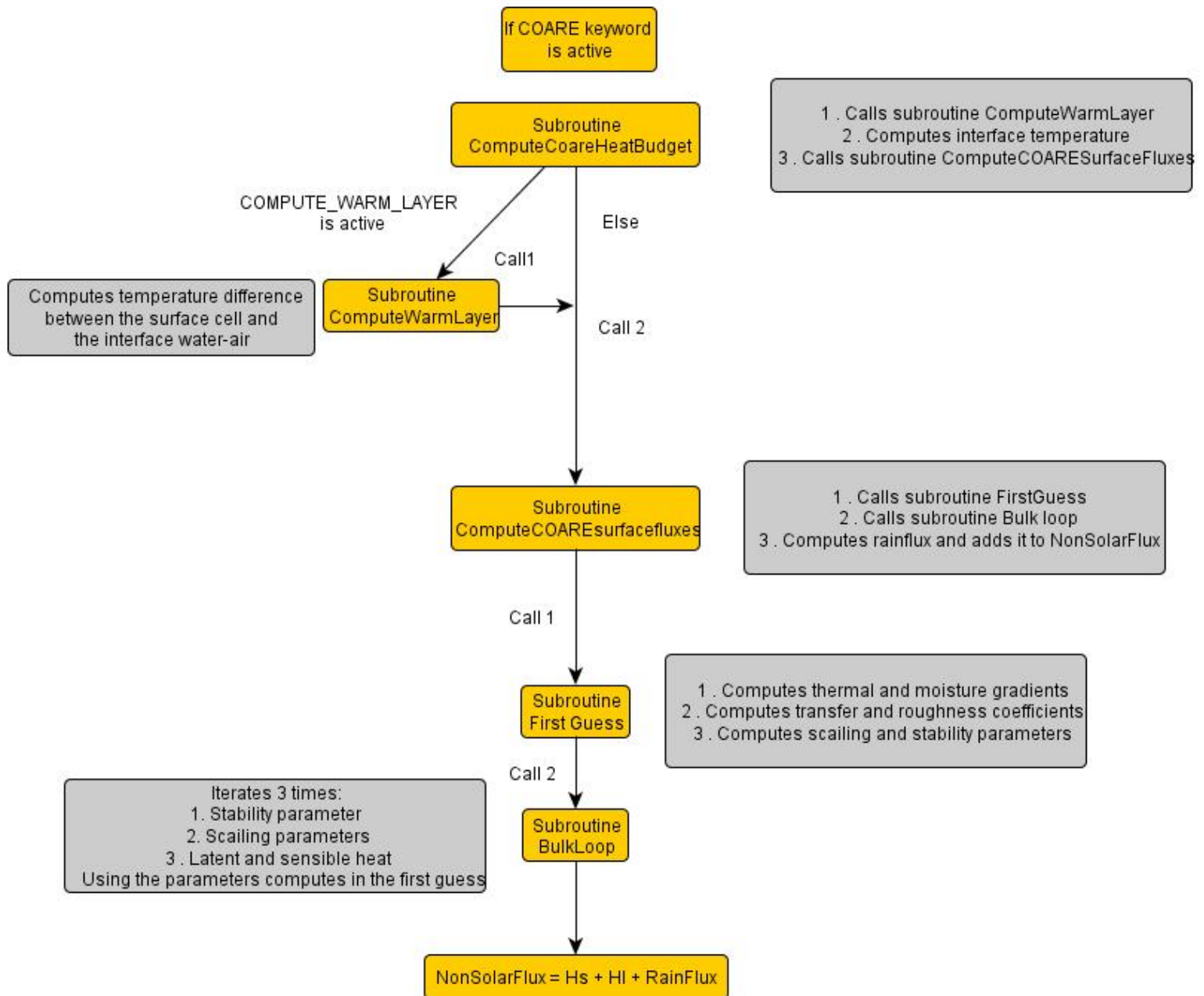
COARE algorithm

- The COARE algorithm is designed to give estimates of the **turbulent fluxes of sensible and latent heat** and the **stress from inputs of bulk variables**
 - developed by C.Fairall (NOAA/ERL), E.F.Bradley (CSIRO), and D.Rogers (Scripps)
- COARE details are documented in:
 - on the algorithm (Fairall et al., 1994a; Bradley and Weller, 1995);
 - cool skin and warm layer effects (Fairall et al.,1994b);
 - bulk transfer coefficients are based on the Liu, Katsaros, Businger (LKB) model (Liu et al., 1979) with some modifications.



$$\text{Non solar flux} = \text{Latent heat} + \text{Sensible heat} + \text{net longwave radiation}$$

- LatentHeat
- SensibleHeat
- NetLongWaveRadiation
- UpwardLongWaveRadiation DownwardLongWaveRadiation
SurfaceRadiation NonSolarFlux
- This algorithm is ready to receive albedo and PBL height and to user must include these properties when using COARE method.
- Albedo is required in all simulations as it is now a property of the InterfaceWaterAir. The user can get Albedo information from meteorological models or time series.



Keywords to use COARE

InterfaceWaterAir.dat

- OUTSIDE the property block:
 - USE_COARE : 1/0
 - COMPUTE_WARM_LAYER : 1/0
 - COMPUTE_COOL_SKIN : 1/0
- INSIDE the property block:
 - add the property “albedo”

Atmosphere.dat

- OUTSIDE the property block:
 - WIND_MEASUREMENT_HEIGHT : X in meters *
 - AIR_MEASUREMENT_HEIGHT : X in meters *
- INSIDE the property block:
 - add the property “pbl height”

* These values are dependent on the source of the data, if they were produced by a meteorological model or measured in a meteorological station. Each source will have its description and the user have to provide this information.

InterfaceWaterAir.dat

RUGOSITY : 0.0025

OUTPUT_TIME : 0 10800.

USE_COARE : 1

COMPUTE_WARM_LAYER : 1

COMPUTE_COOL_SKIN : 1

FILTER_SPIKES : 0

<beginproperty>

NAME : **surface radiation**

UNITS : W/m^2

DESCRIPTION : climatologic solar radiation

...

<endproperty>

<beginproperty>

NAME : **latent heat**

UNITS : W/m^2

DESCRIPTION : Calculated latent heat

...

<endproperty>

<beginproperty>

NAME : **albedo**

UNITS : W/m^2

DESCRIPTION : climatologic solar radiation

...

<endproperty>

<beginproperty>

NAME : **sensible heat**

UNITS : W/m^2

DESCRIPTION : Calculated sensible heat

...

<endproperty>

<beginproperty>

NAME : **net long wave radiation**

UNITS : W/m^2

DESCRIPTION : Calculated net long wave radiation

...

<endproperty>

<beginproperty>

NAME : **upward long wave radiation**

UNITS : W/m^2

DESCRIPTION : Calculated upward long wave radiation

...

<endproperty>

<beginproperty>

NAME : **downward long wave radiation**

UNITS : W/m^2

DESCRIPTION : Calculated downward long wave radiation

...

<endproperty>

<beginproperty>

NAME : **non solar flux**

UNITS : W/m^2

DESCRIPTION : Calculated infrared radiation

...

<endproperty>

<beginproperty>

NAME : **evaporation**

UNITS : mg/s

DESCRIPTION : oxygen flux through the water air interface

...

<endproperty>

<beginproperty>

NAME : **surface water flux**

UNITS : mg/s

DESCRIPTION : oxygen flux through the water air interface

...

<endproperty>

<beginproperty>

NAME : **wind stress**

UNITS : N/m2

DESCRIPTION : wind stress

DEFAULTVALUE : 0.0 0.0

...

<endproperty>

<beginproperty>

NAME : **wind shear velocity**

UNITS : m/s

DESCRIPTION : computed wind shear velocity

...

<endproperty>

Atmosphere.dat

OUTPUT_TIME : 0 3600.
RUGOSITY : 0.0025
WIND_MEASUREMENT_HEIGHT : 10.
AIR_MEASUREMENT_HEIGHT : 10.

<beginproperty>

NAME : **wind velocity**
UNITS : m/s
DESCRIPTION : wind velocity

...

<endproperty>

<beginproperty>

NAME : **pbl height**
UNITS : m
DESCRIPTION : planetary boundary layer

...

<endproperty>

<beginproperty>

NAME : **precipitation**
UNITS : mm/hour
DESCRIPTION : precipitation description

...

<endproperty>

<beginproperty>

NAME : **solar radiation**
UNITS : W/m²
DESCRIPTION : meteolST Solar Radiation
ALBEDO : 0.05 ![%]

....

<endproperty>

<beginproperty>

NAME : **air temperature**
UNITS : °C
DESCRIPTION : Temperature

...

<endproperty>

<beginproperty>

NAME : **relative humidity**
UNITS : fraction
DESCRIPTION : Humidity from WRF model results

...

<endproperty>

<beginproperty>

NAME : **mean sea level pressure**
UNITS : Pa
DESCRIPTION : Mean Sea Level Pressure from WRF model results

...

<endproperty>

<beginproperty>

NAME : **cloud cover**
UNITS : fraction
DESCRIPTION : cloud cover

....

<endproperty>