

# s2dverification

C. Prodhomme, V. Torralba

SPECS, General Assembly, Meteo France, Toulouse, October 22th, 2014

Developers: Nicolau Manubens, Virginie Guemas, Javier García-Serrano,  
Chloé Prodhomme, Veronica Torralba, Ludovic Auger, Isabel Andreu-Burillo,  
Fabian Lienert

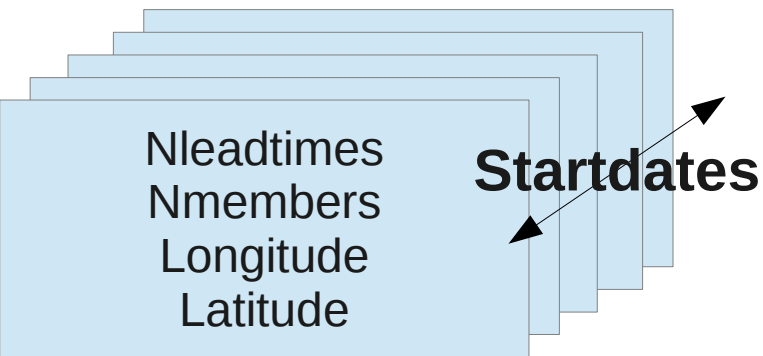
## Objectives

- Compute basic statistics on seasonal and decadal forecasts (climatologies, anomalies, seasonal and regional mean...)
- Compute deterministic skill scores with their confidence interval and/or significance level
- Plot maps and time series

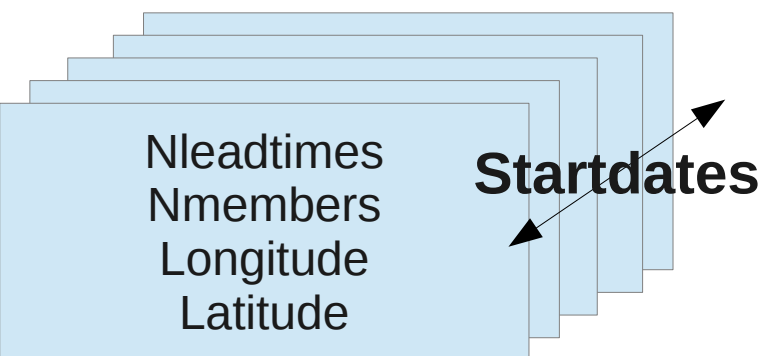


# Input: ncdf files

**Model 1**

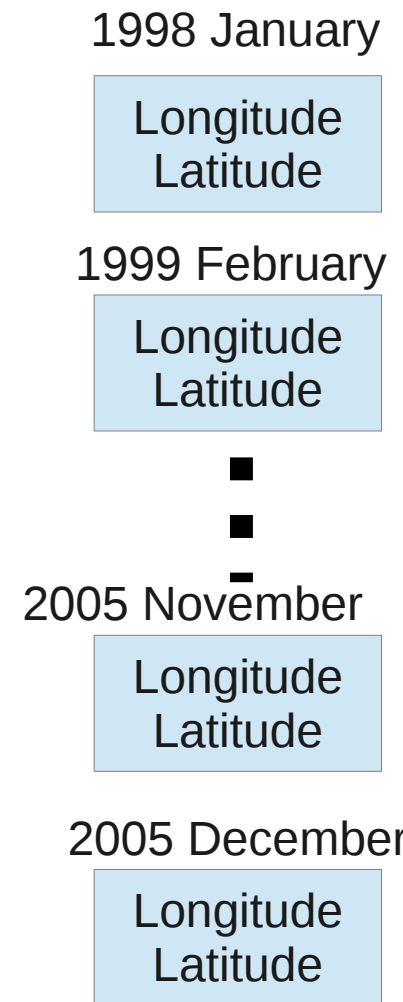


**Model 2**

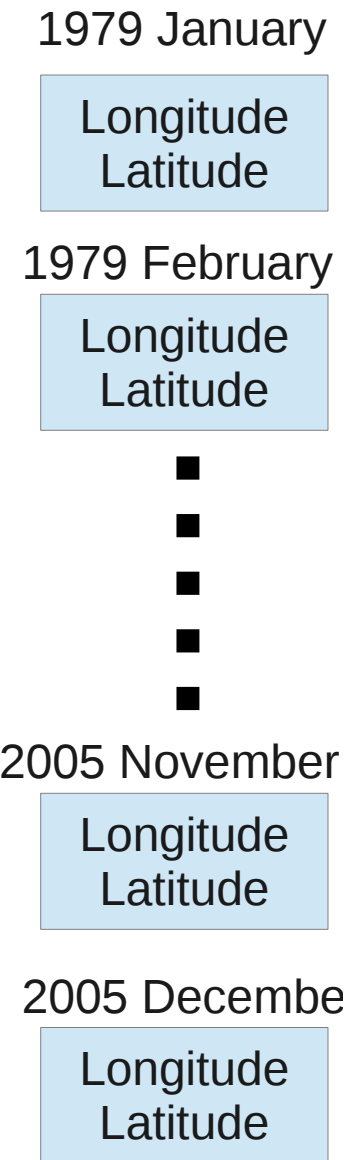


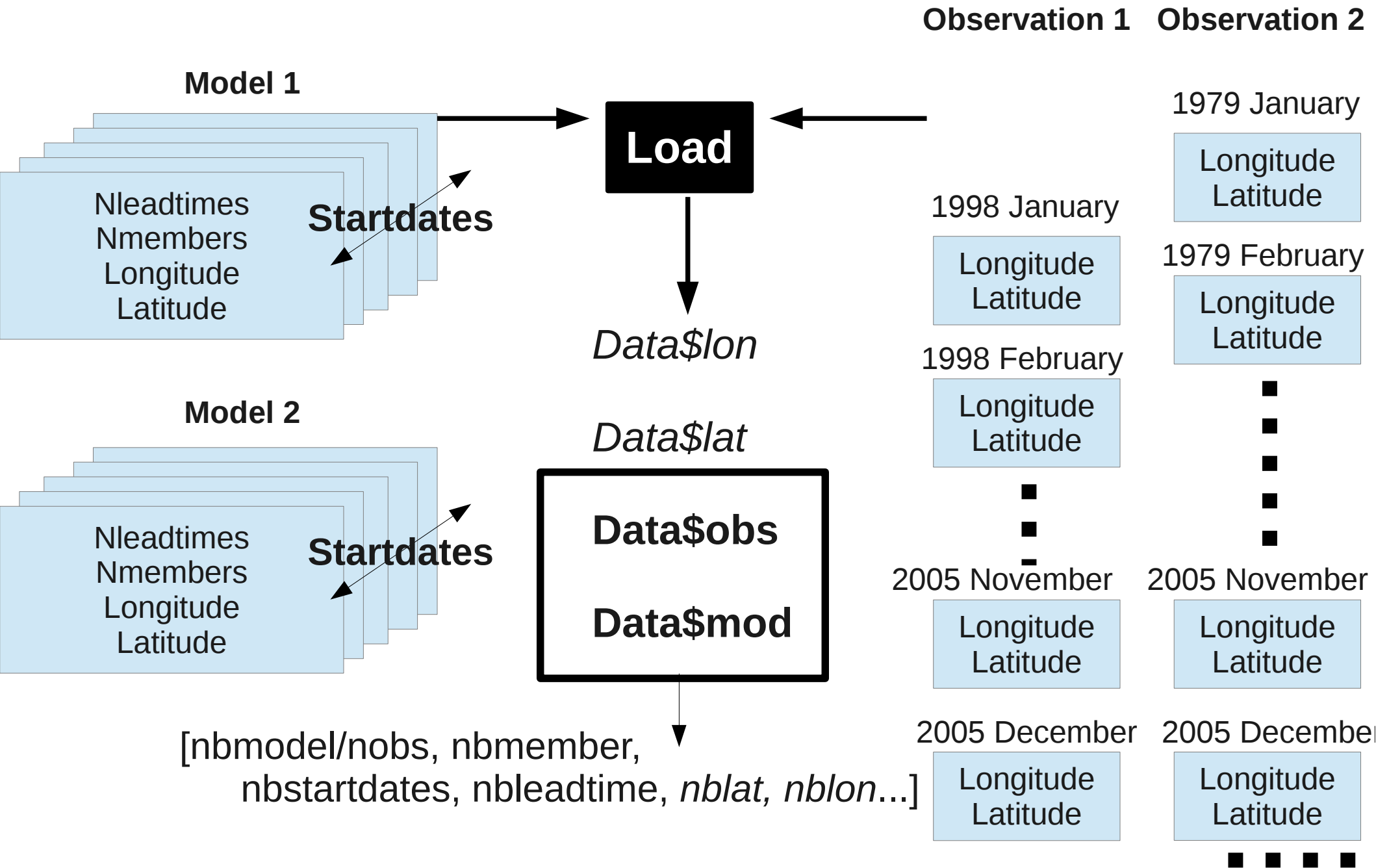
■  
■  
■  
■  
■

**Observation 1**



**Observation 2**





**Load**

*Data\$lon*

*Data\$lat*

**Data\$nobs**

**Data\$mod**



[nbmodel/nobs, nbmember,  
nbstartdates, nbleadtime, *nblat*, *nblon*...]

This function depends on the data you are using:

- Path
- ncdf format
- system (Unix, windows)

We are working on a generalisation of the Load function.

Right now, you have to find your own way to Load your data and obtain the same structure.

Corr

**Load**

Trend

ACC

Smoothing

RMS  
RatioRMS

Data\$lon

Season

RatioSDRMS

Data\$lat

Regression

RMSSS

**Data\$nobs**

Filter

Spread

**Data\$mod**

Ano  
Ano\_crossvalid

[nbmodel/nobs, nbmember,  
nbstartdates, nbleadtime, nblat, nblon...]

Clim

## Example

Load

Clim

PlotClim

Ano

Mean1Dim

Corr

PlotVsLTime

```
sampleMap <- Load('tos', c('i00k'), c('ERSST'), c('19851101',  
'19901101', '19951101', '20001101', '20051101'), nleadtime = 124,  
leadtimemin = 1, leadtimemax = 60, sampleperiod = 1, output =  
'lonlat', latmin = 30, latmax = 45, lonmin = 0, lonmax = 40)
```

```
clim=Clim(sampleTimeSeries$mod, sampleTimeSeries$obs,  
memb=FALSE)
```

```
PlotClim(clim$clim_exp, obs_clim=clim$clim_obs,  
fileout = "plotclim.eps")
```

```
anomod=Ano(sampleTimeSeries$mod,clim$clim_exp)  
anoobs=Ano(sampleTimeSeries$obs,clim$clim_obs)
```

```
ensmeanmod=Mean1Dim(anomod,2)  
ensmeanobs=Mean1Dim(anoobs,2)
```

```
cor=Corr(ensmeanmod, ensmeanobs)
```

```
PlotVsLTime(cor)
```



## *Interaction between SpecsVerification and s2dverification*

### **Issue**

- The tools in SpecsVerification works with data for one grid point, one experiment, and one lead time.
- The structure of the data in s2dverification  
[nbmodel/nobs, nbmember, nbstartdates, nbleadtime, nblat, nblon...]  
→ *How to pass from one data structure to the other ?*

### **Methods**

- Use a loop
- Reorganise the arrays
- Use apply

### **Caveats**

- Not generic (only valid for 1 experiment and 1 observation)

## Example

Load

Season

Mean1Dim

Rankhist

PlotRankhist

```
sampleMap <- Load('tos', c('i00k'), c('ERSST'), c('19851101', '19901101',  
'19951101', '20001101', '20051101'), nleadtime = 124, leadtimemin = 1,  
leadtimemax = 60, sampleperiod= 1, output = 'lonlat', latmin = 30, latmax = 45,  
lonmin = 0, lonmax = 40)
```

```
nexp<-dim(sampleMap$mod)[1]; nmemb<-dim(sampleMap$mod)[2]  
nsdates<-dim(sampleMap$mod)[3]; nlat<-dim(sampleMap$mod)[5];  
nlon<-dim(sampleMap$mod)[6]
```

```
seamod<-Season(sampleMap$mod,posdim=4,11,12,2)  
seaobs<-Season(sampleMap$obs,posdim=4,11,12,2)
```

```
smeanmod<-Mean1Dim(seamod,4)  
smeanobs<-Mean1Dim(seaobs,4)
```

```
# the arrays are reorganised  
# [nexp,nmemb,nsdates,nlat,nlon]--->[nexp,nmemb,nsdates*nlat*nlon]  
sampleMod<-array(smeanmod,dim=c(nexp,nmemb,nsdates*nlat*nlon))  
sampleObs<-array(smeanobs,dim=c(nexp,1,nsdates*nlat*nlon))
```

```
# the data of the model are transposed and the ones are deleted  
ens<-t(drop(sampleMod))  
obs<-drop(sampleObs)  
RH<-Rankhist(ens,obs)
```

```
PlotRankhist(RH,mode='prob.paper')
```

## *Future plans*

- Generalisation of the Load function (configuration file)
- Use of OPeNDAP
- Optimisation
- Parallelisation
- Bootstrap to test significance
- Interface with SpecsVerification (and probabilistic score)
- More plotting functions