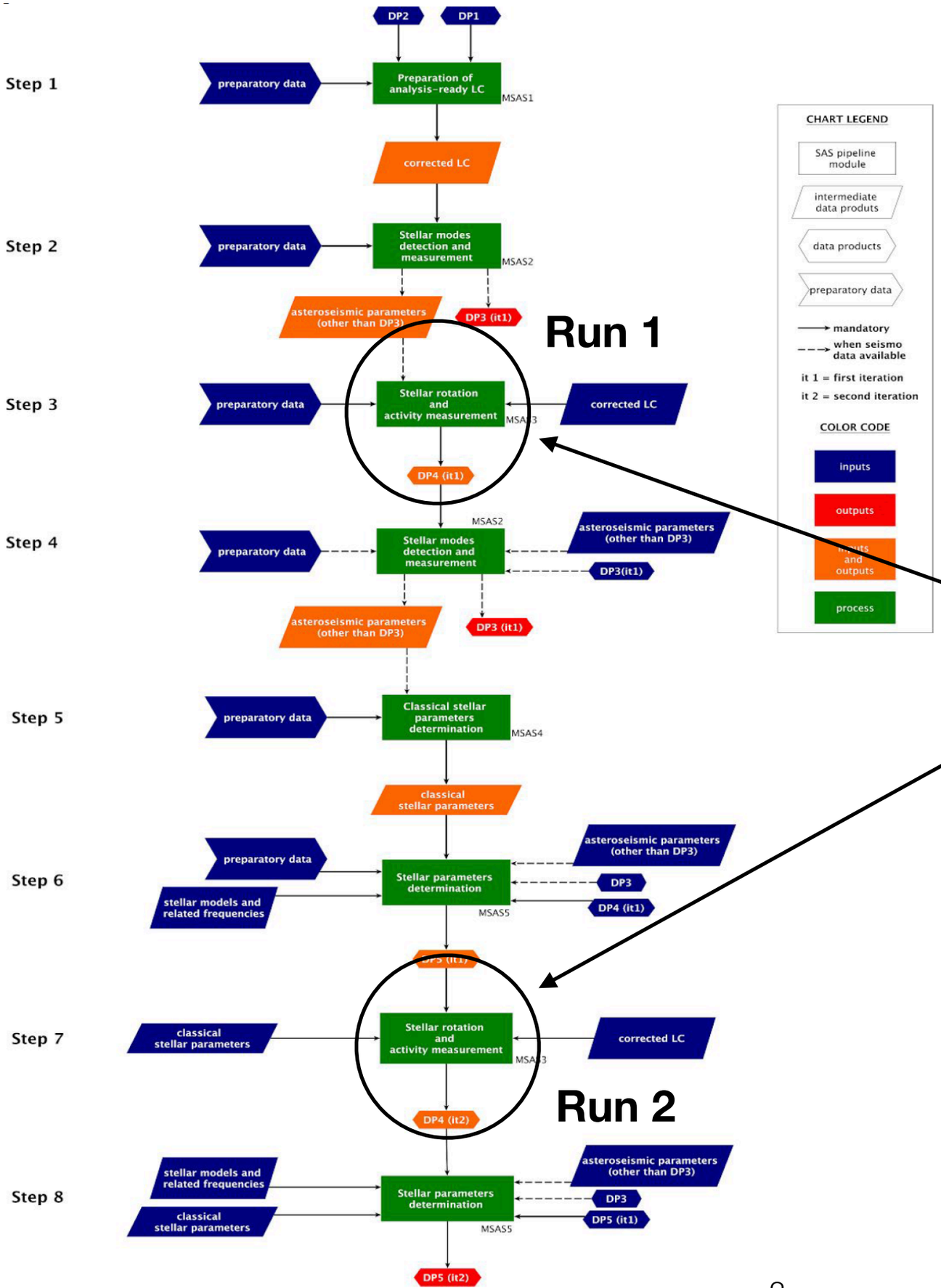
# Overview of the MSCOPP3 for DP4

## [Overview of the pipeline for rotation and activity measurements]

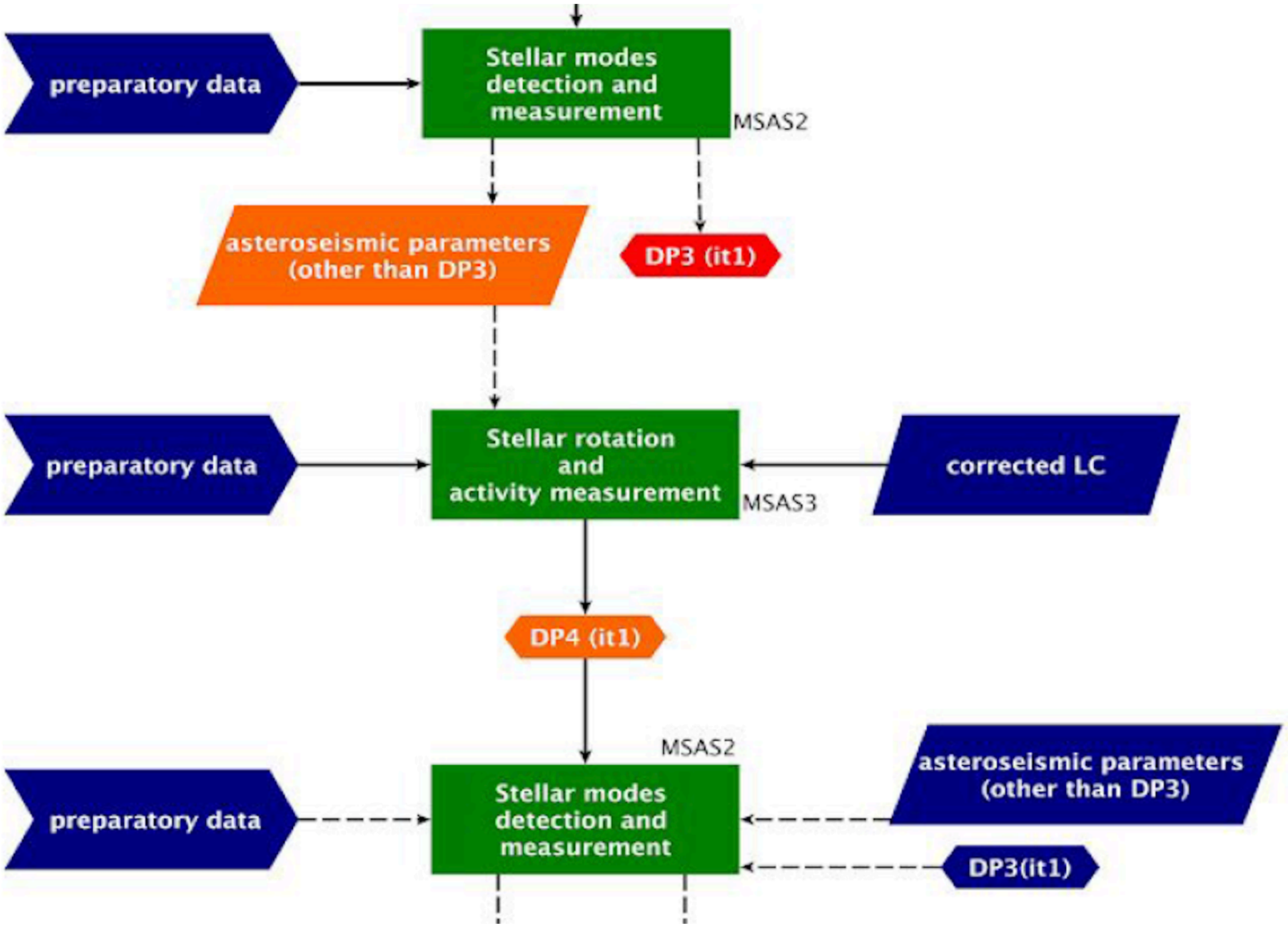
F. Baudin, N. Lanza and the WP120 team

# Context


DP2
DP1
Step 1
preparatory data
Preparation of analysis-ready LC
MSAS1
corrected LC
Step 2
preparatory data
Stellar modes detection and measurement
MSAS2
asteroseismic parameters (other than DP3)
DP3 (it1)
Run 1
Step 3
preparatory data
Stellar rotation and activity measurement
corrected LC
DP4 (it1)
Step 4
MSAS2
preparatory data
Stellar modes detection and measurement
asteroseismic parameters (other than DP3)
DP3(it1)
asteroseismic parameters (other than DP3)
DP3 (it1)
Step 5
preparatory data
Classical stellar parameters determination
MSAS4
classical stellar parameters
Step 6
preparatory data
stellar models and related frequencies
Stellar parameters determination
asteroseismic parameters (other than DP3)
DP3
DP4 (it1)
MSAS5
Step 7
classical stellar parameters
Stellar rotation and activity measurement
corrected LC
DP4 (it2)
Run 2
Step 8
stellar models and related frequencies
classical stellar parameters
Stellar parameters determination
asteroseismic parameters (other than DP3)
DP3
DP5 (it1)
MSAS5
DP5 (it2)
CHART LEGEND
SAS pipeline module
intermediate data produts
data products
preparatory data
mandatory
when seismo data available
it 1 = first iteration
it 2 = second iteration
COLOR CODE
inputs
outputs
inputs and outputs
process
You are here

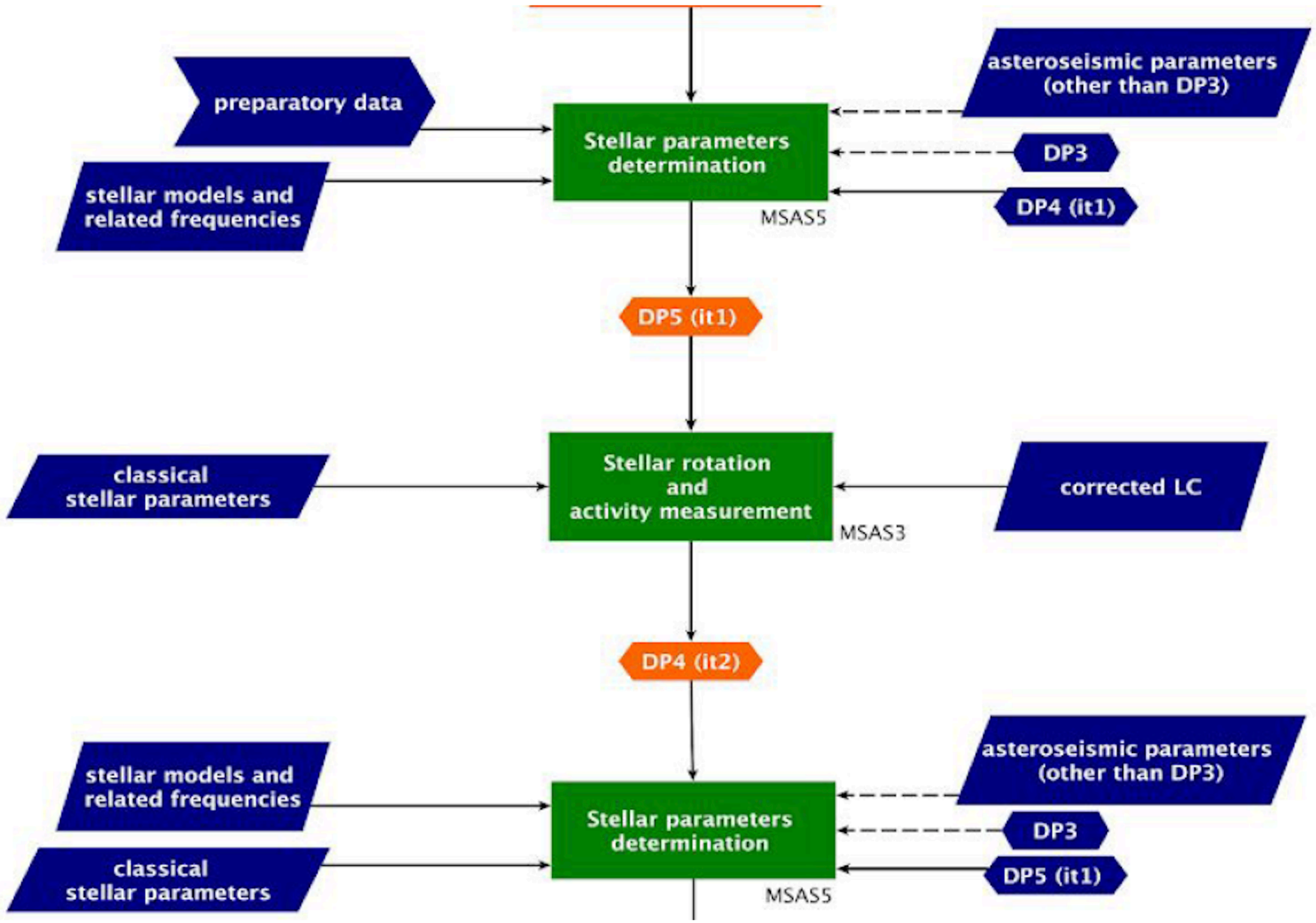
# Context: Run 1

**Step 3**



# Context: Run 2

**Step 7**



# Let's start with the end: the Data Products 4

| | | |
|---|---|---|
| **DP4_123_PROT** | Rotation period | |
| **DP4_123_DELTAPROT** | Differential rotation | Amplitude of the surface differential rotation inferred from spot modelling |
| **DP4_123_PCYCLE** | Cycle period | Inferred from spot modeling (?) |
| **DP4_123_HARVEYN_AMPLITUDE**<br>**DP4_123_HARVEYN_TIME**<br>**DP4_123_HARVEYN_EXPONENT** | Harvey profiles characteristics (amplitude, width, | (fitted) Profiles modelling the activity in the Fourier background |
| **DP4_123_WHITE-NOISE-FOURIER** | White noise in the Fourier spectrum | Fitted in the spectrum |

**DP come with error bars or PDF**

# Let's start with the end: the Intermediate Data Products 4

| | |
|---|---|
| **IDP_123_VARLC** | (Non-seismic) Variability Analysis-ready LC |
| **IDP_123_MOD-LC-SPOT** | Modelled LC reconstructing the variations due to spots |
| **IDP_123_MOD-TAU-SPOT** | Mean spots lifetime estimates from spot modelling<br>(+ other characteristics? position, etc...) |
| **IDP_123_LOGG-GRANULATION** | log g determined from the granulation profile |

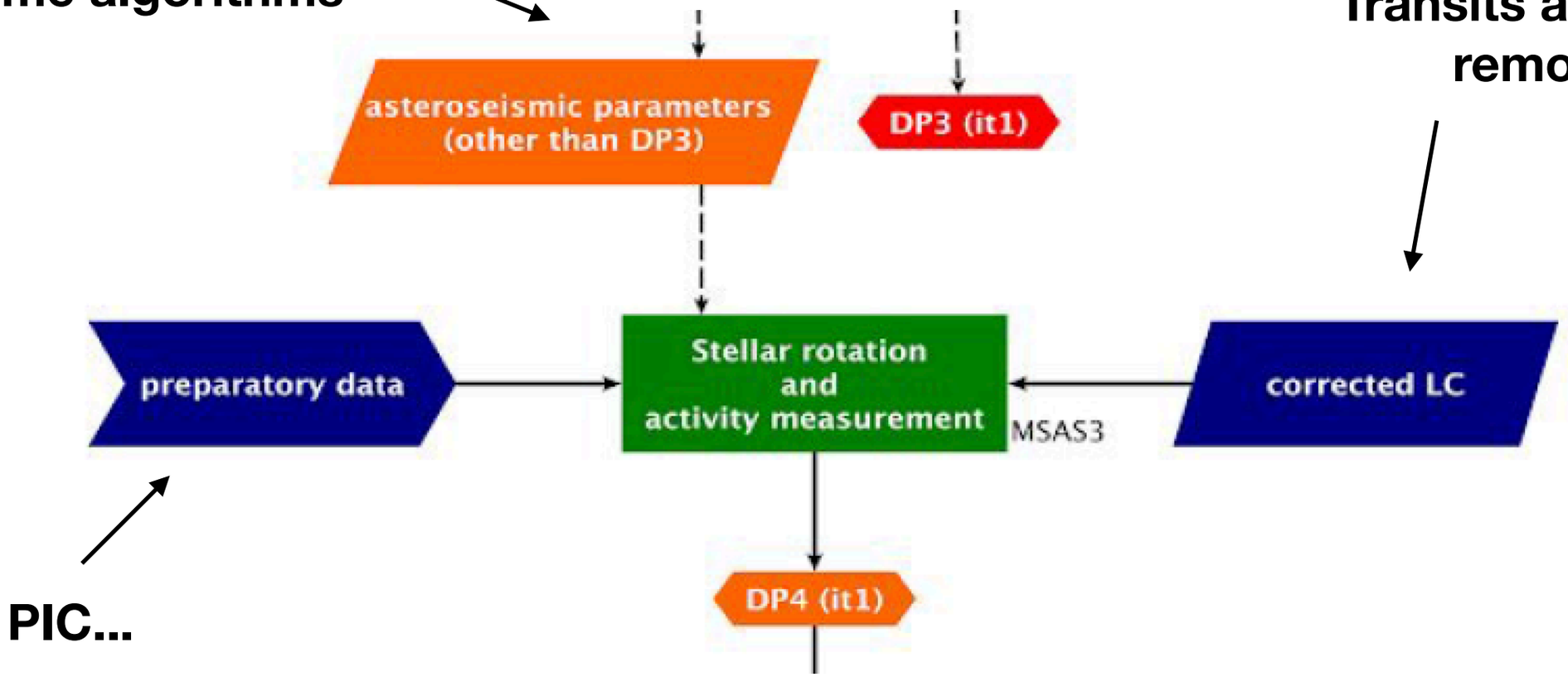
# Let's start with the end: the Additional Data Products 4

| | |
|---|---|
| **ADP_123_INCLINATION-ANGLE-SPOT** | Estimate from spot modelling |
| **ADP_123_AGE-GYROCHRONOLOGY** | Age determined from gyro chronology |

**+ list of flares? (talk by B. Stelzer)**

# Run 1: the inputs

**Such as mass or radius (or from Input Catalog), as initial parameter for some algorithms**



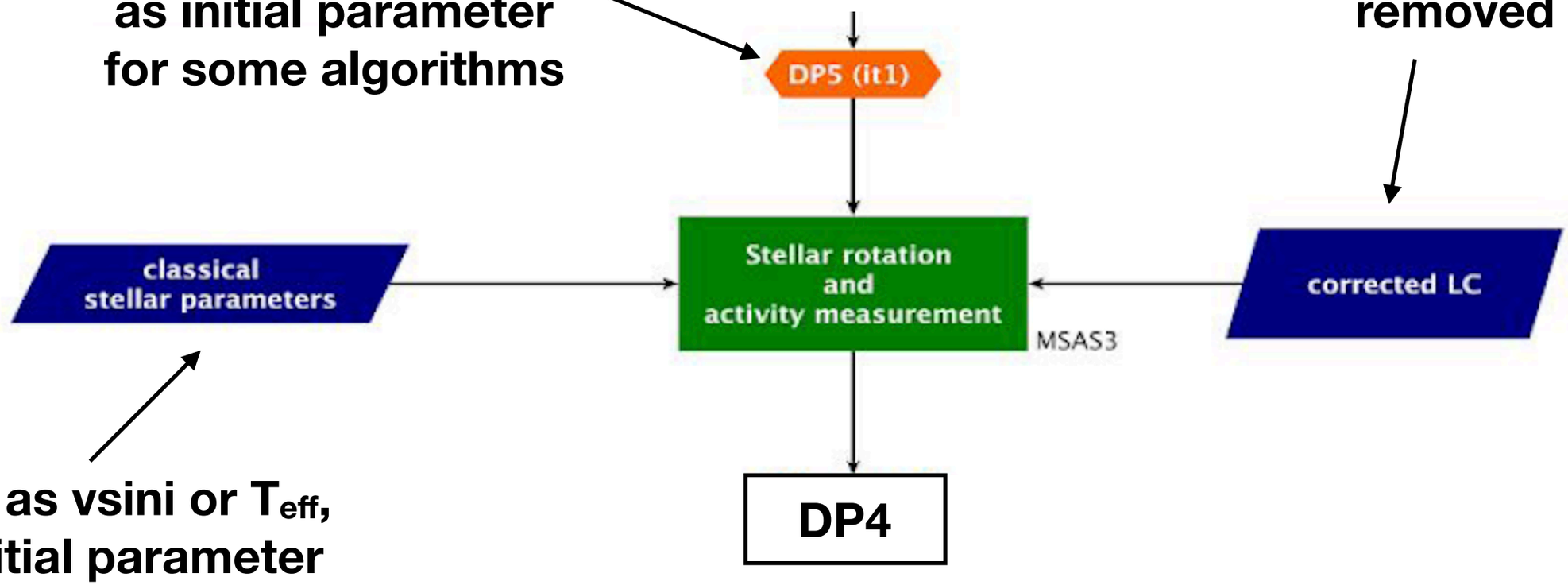

**Transits and flares removed**

**PIC...**

# Run 2: the inputs

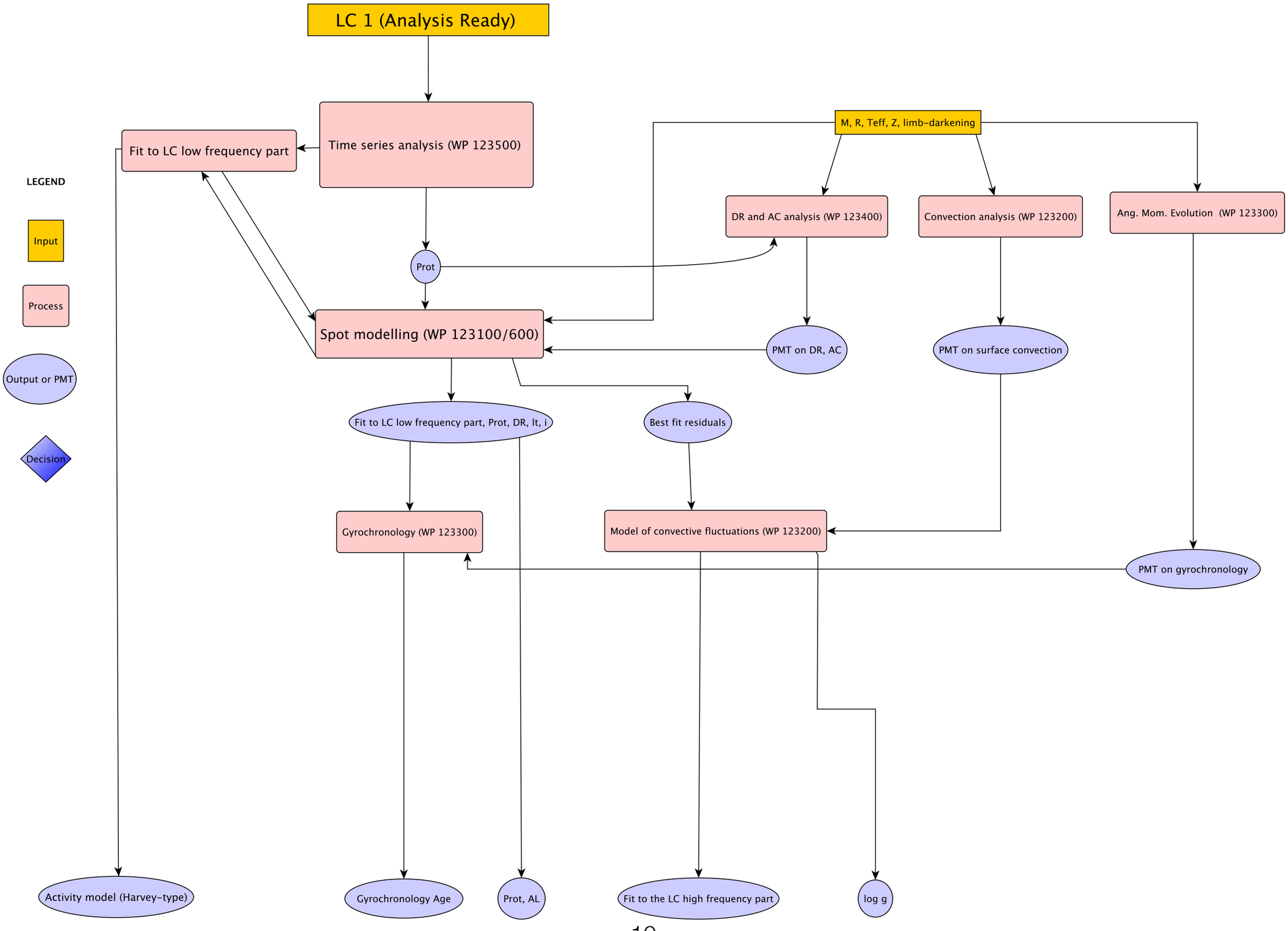
**Such as mass, radius, inclination angle, as initial parameter for some algorithms**

**Transits and flares removed**

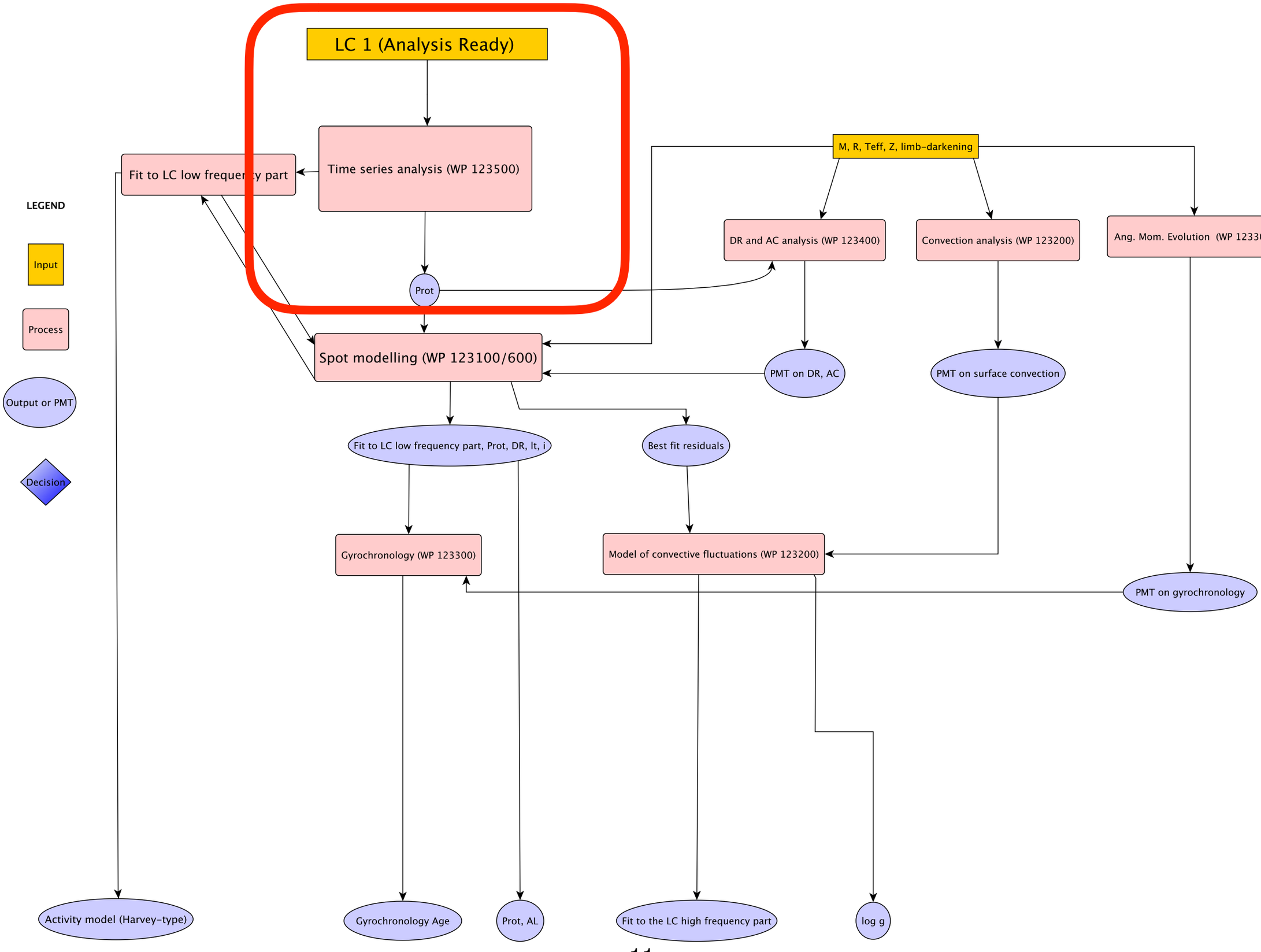



**Such as vsini or $T_{eff}$, as initial parameter for some algorithms**

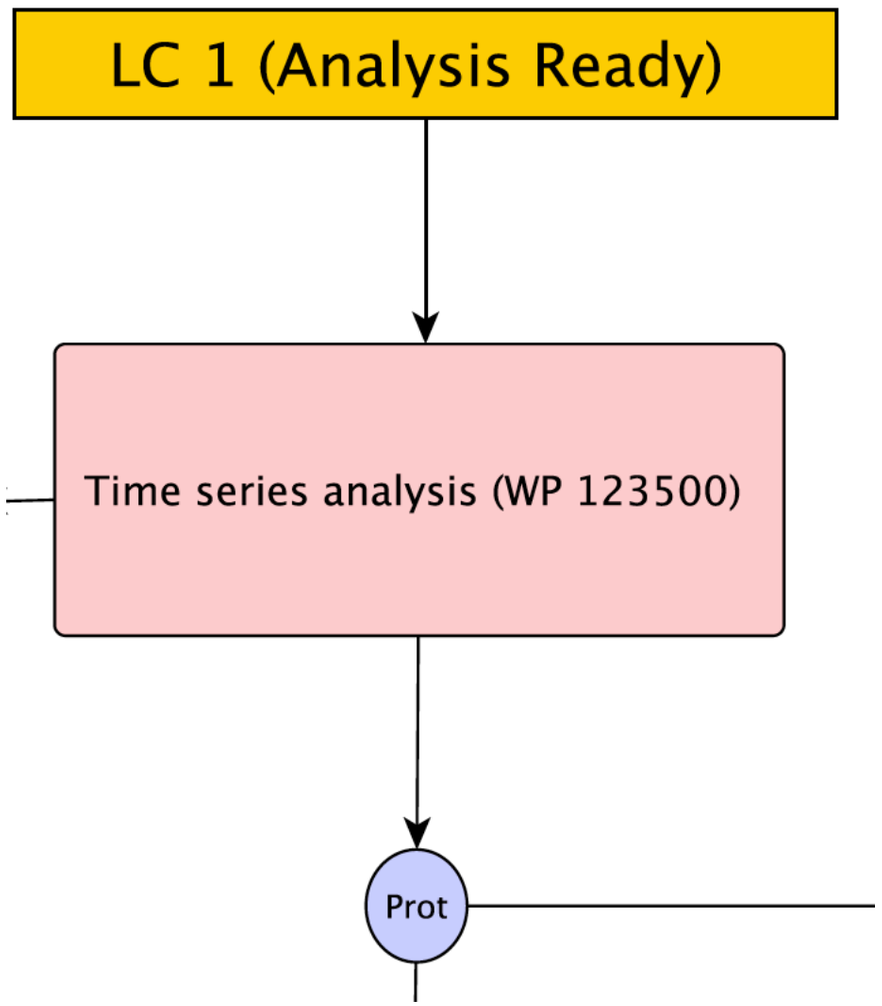
# The pipeline



# The pipeline



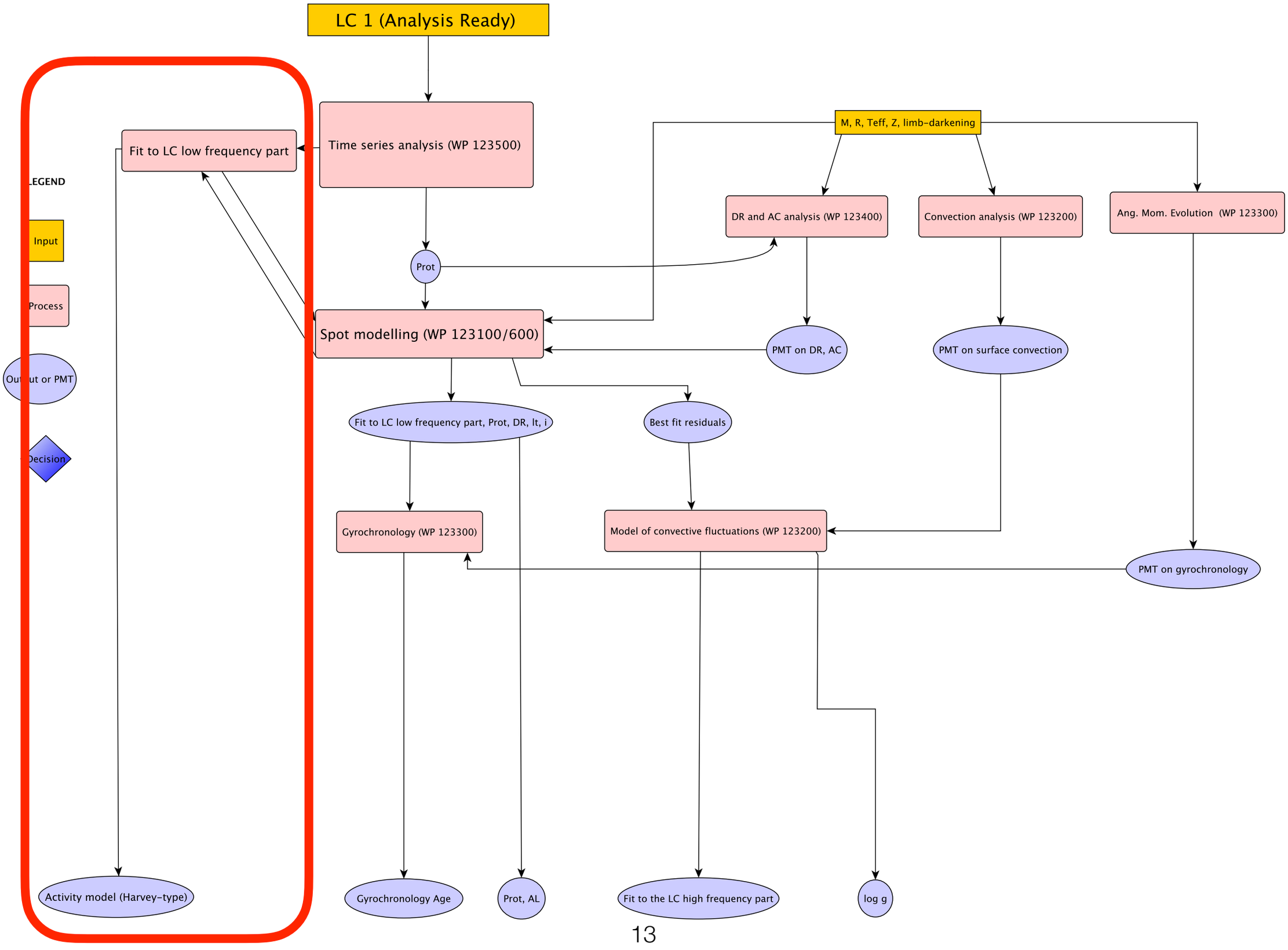
# The pipeline



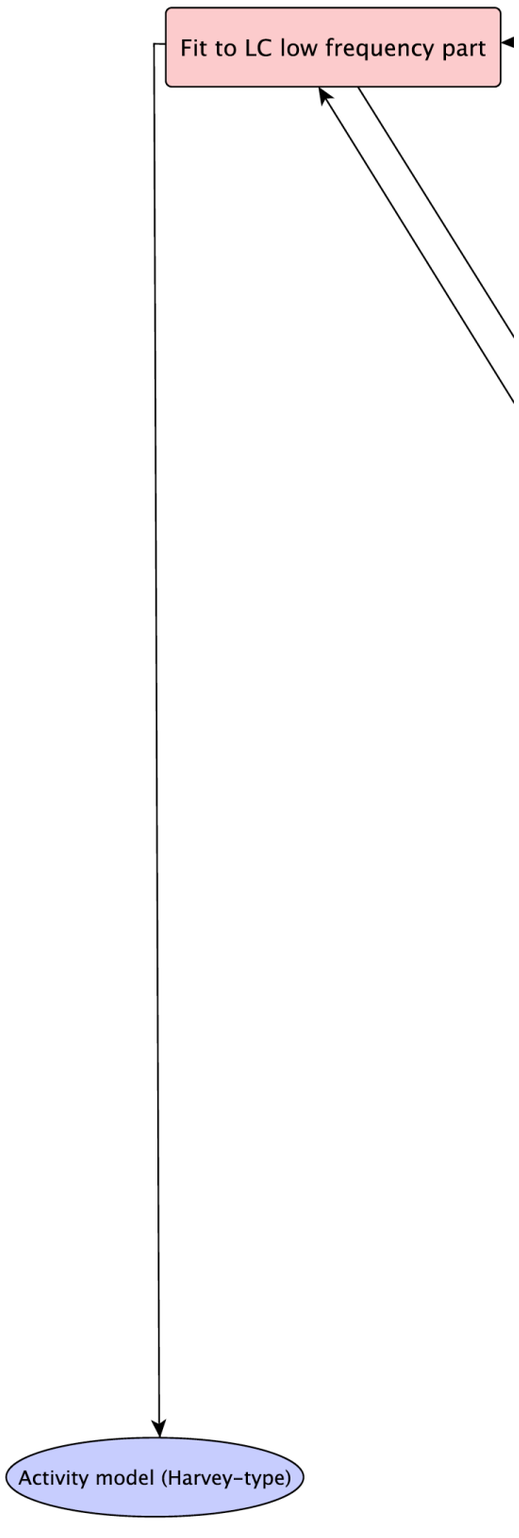

**WP123500**
**Several existing and reliable methods (from spectrum, ACF...)**
**See TN by Nuccio and talk by S. Messina**

**=> NMW**
**(No Much Worries)**

# The pipeline



# The pipeline

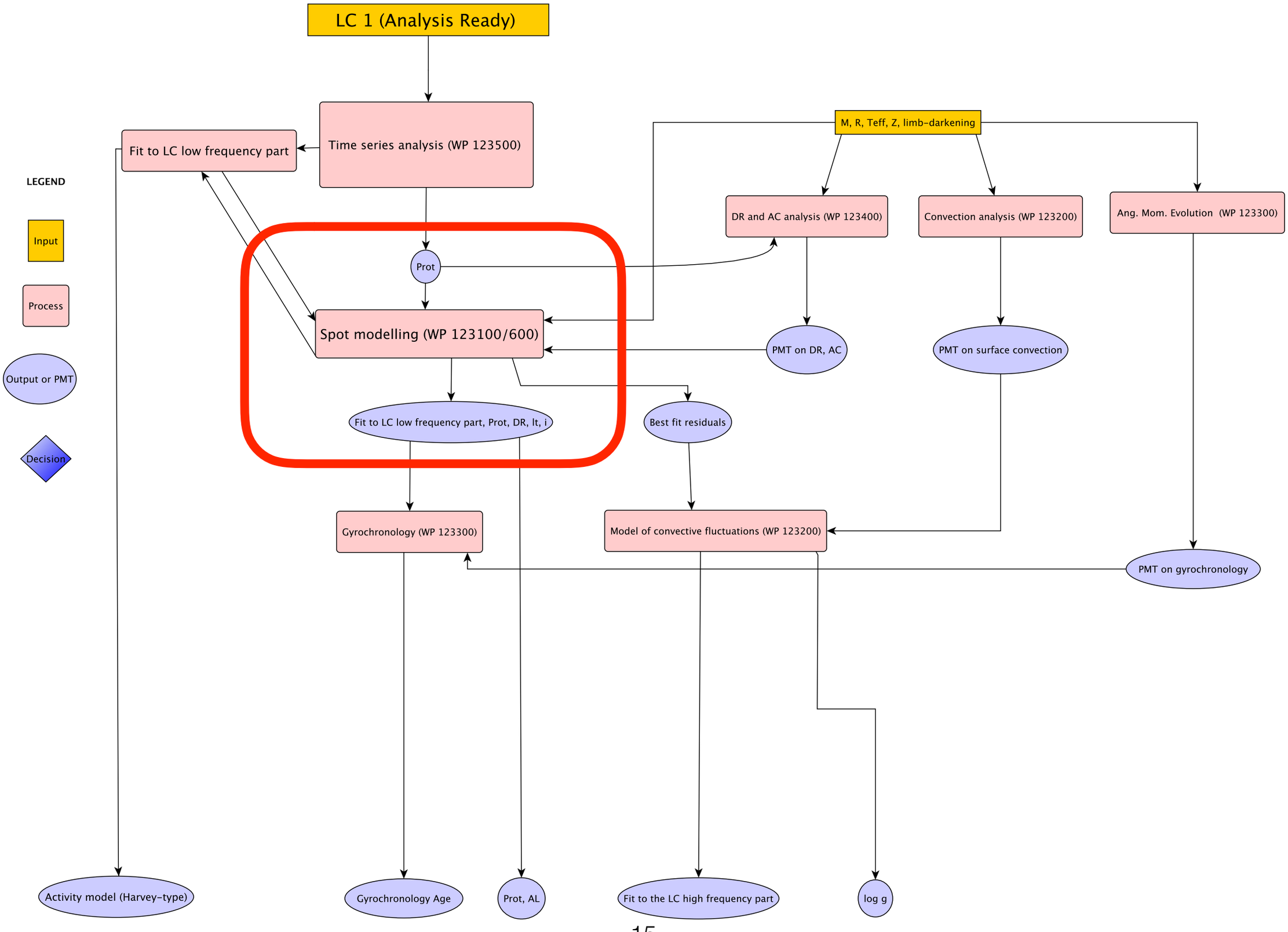



**WP123500**
**Simple fit, performed without too many problems (?)**

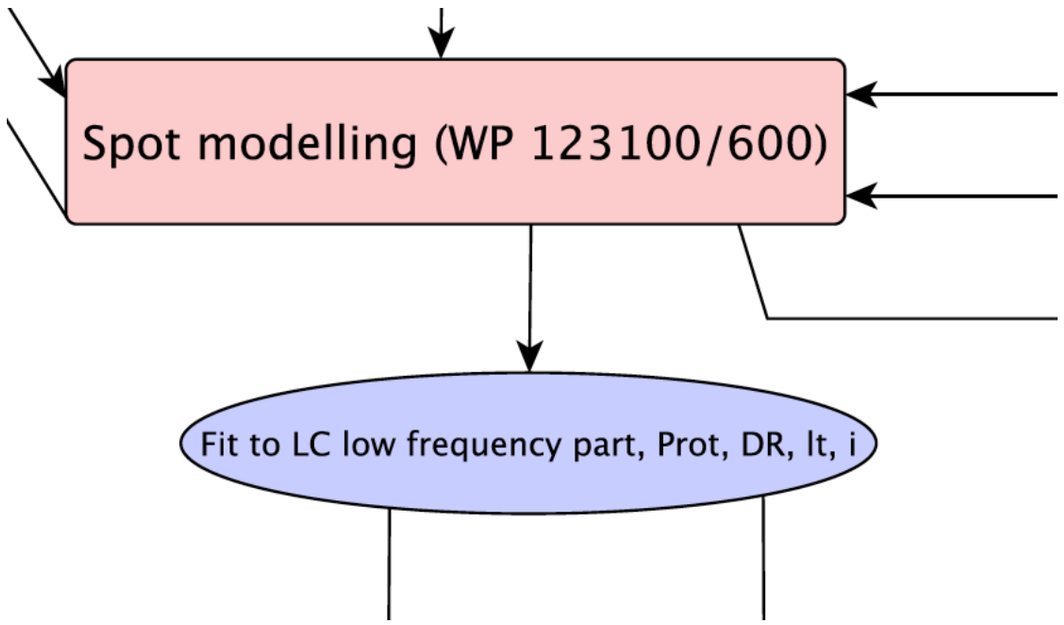
**Useful in Run 1 (?)**
**Possible comparison with spot modeling in Run 2**

**=> NW**
**(No Worries)**

# The pipeline



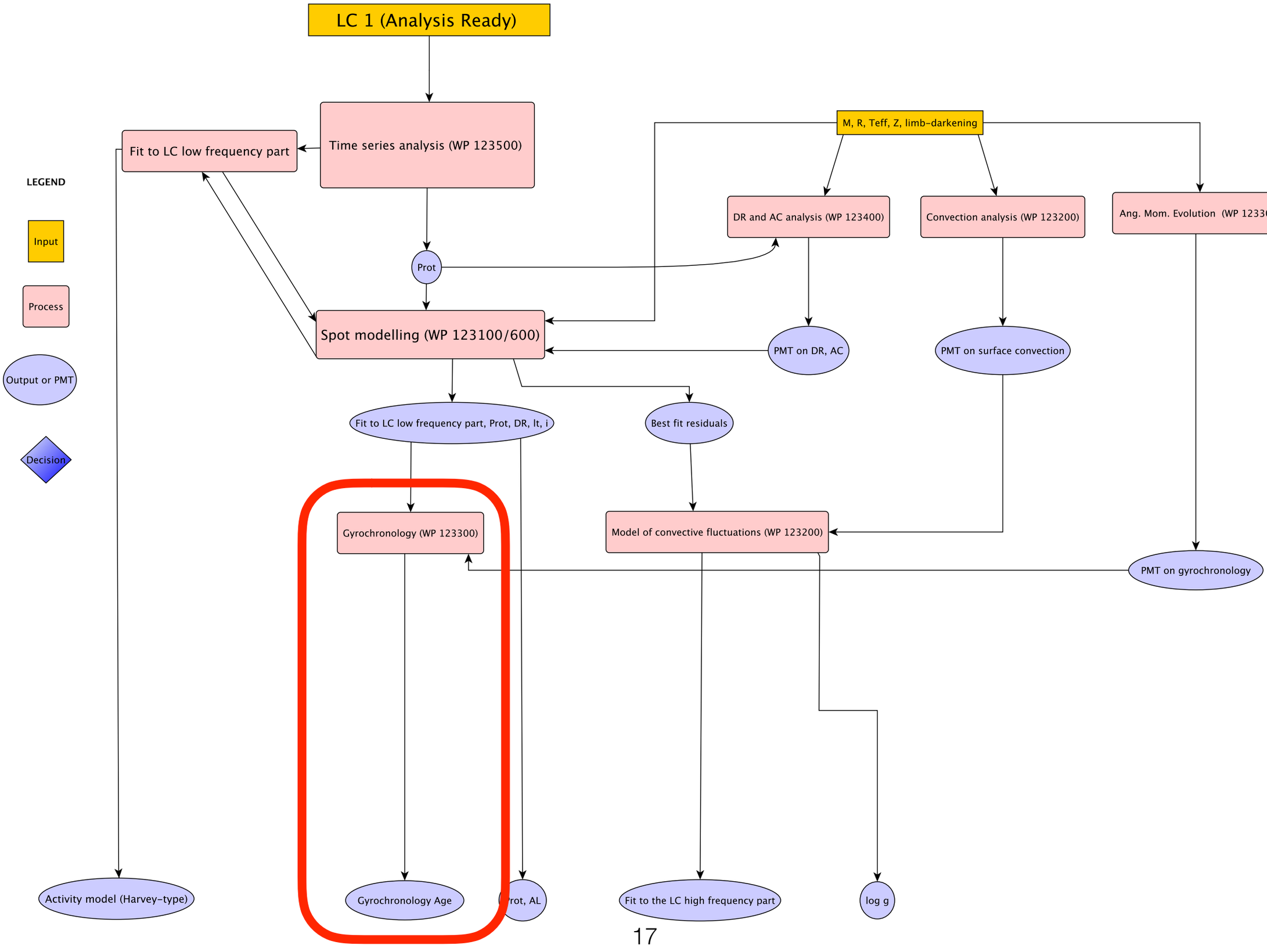
# The pipeline



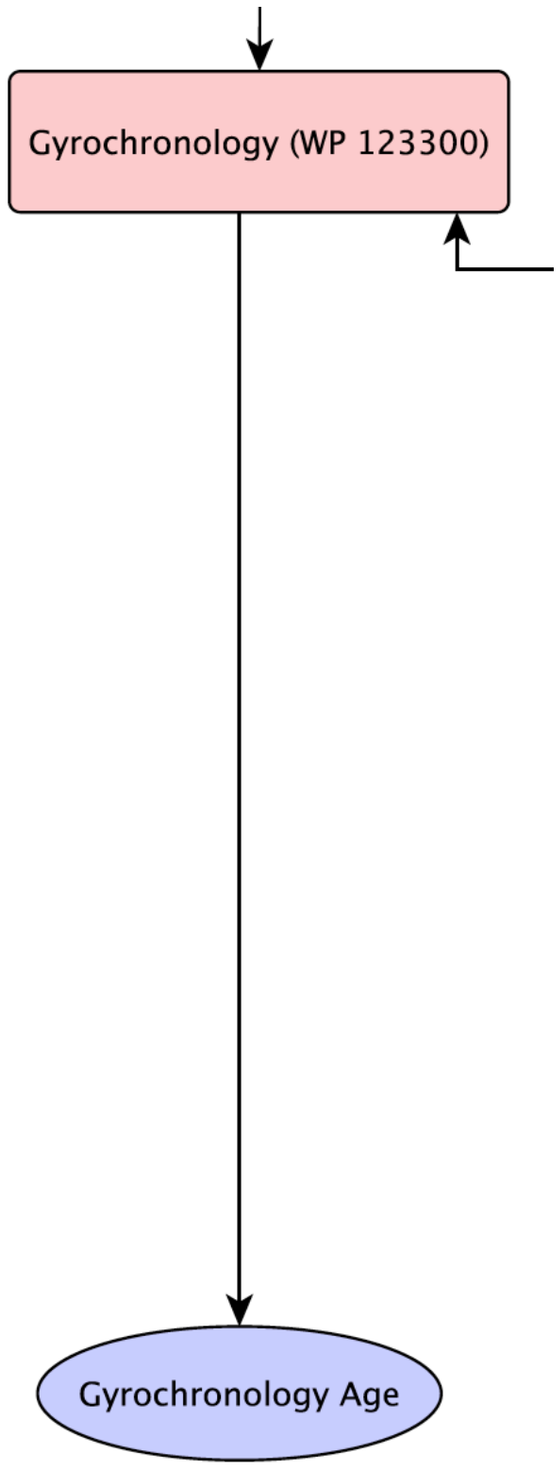

**WP123100/600**
**Very tricky**
**No existing reliable algorithm**
**See Nadège's talk**

**=> SW**
**(Serious Worries)**

# The pipeline



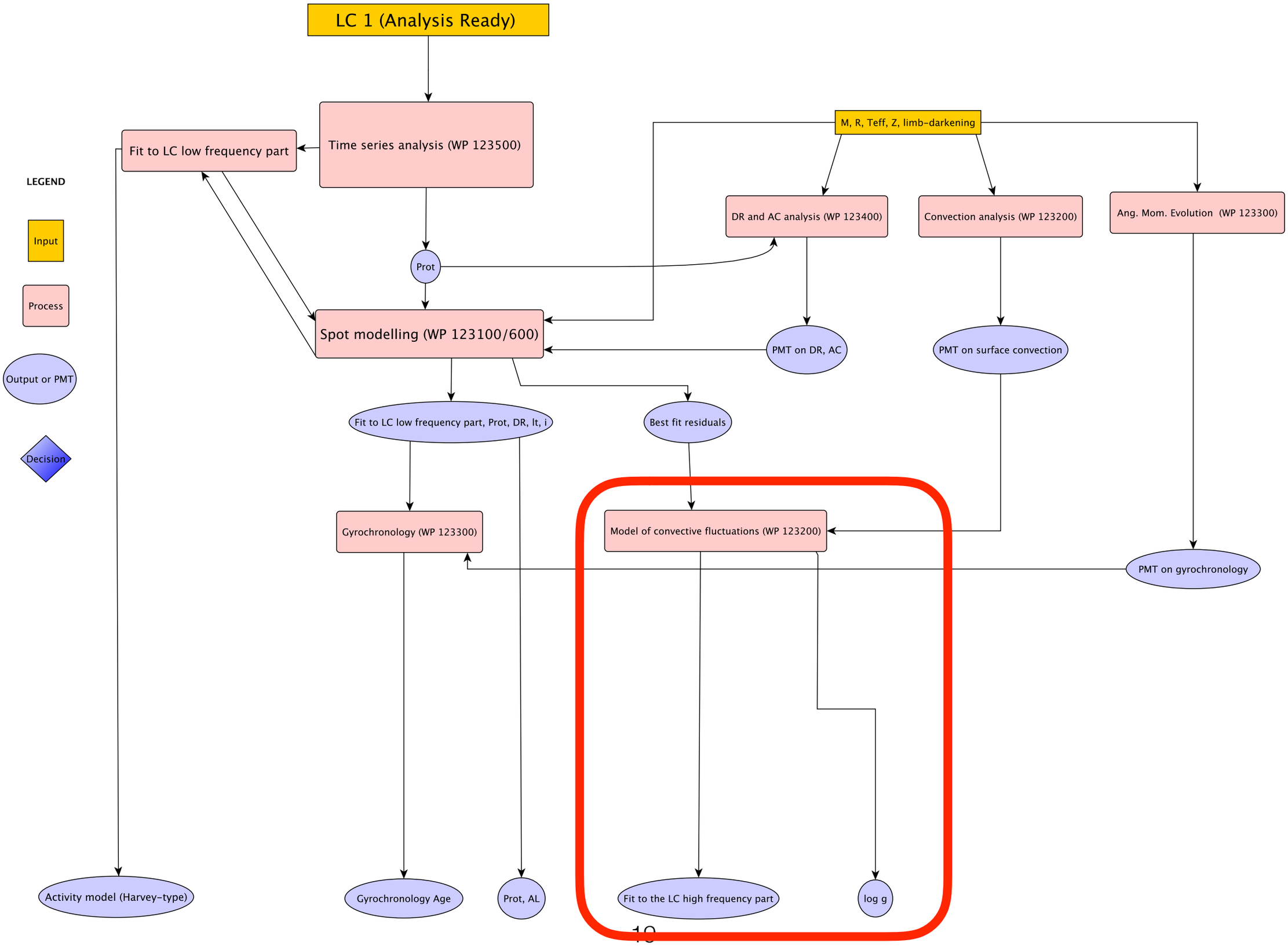
# The pipeline



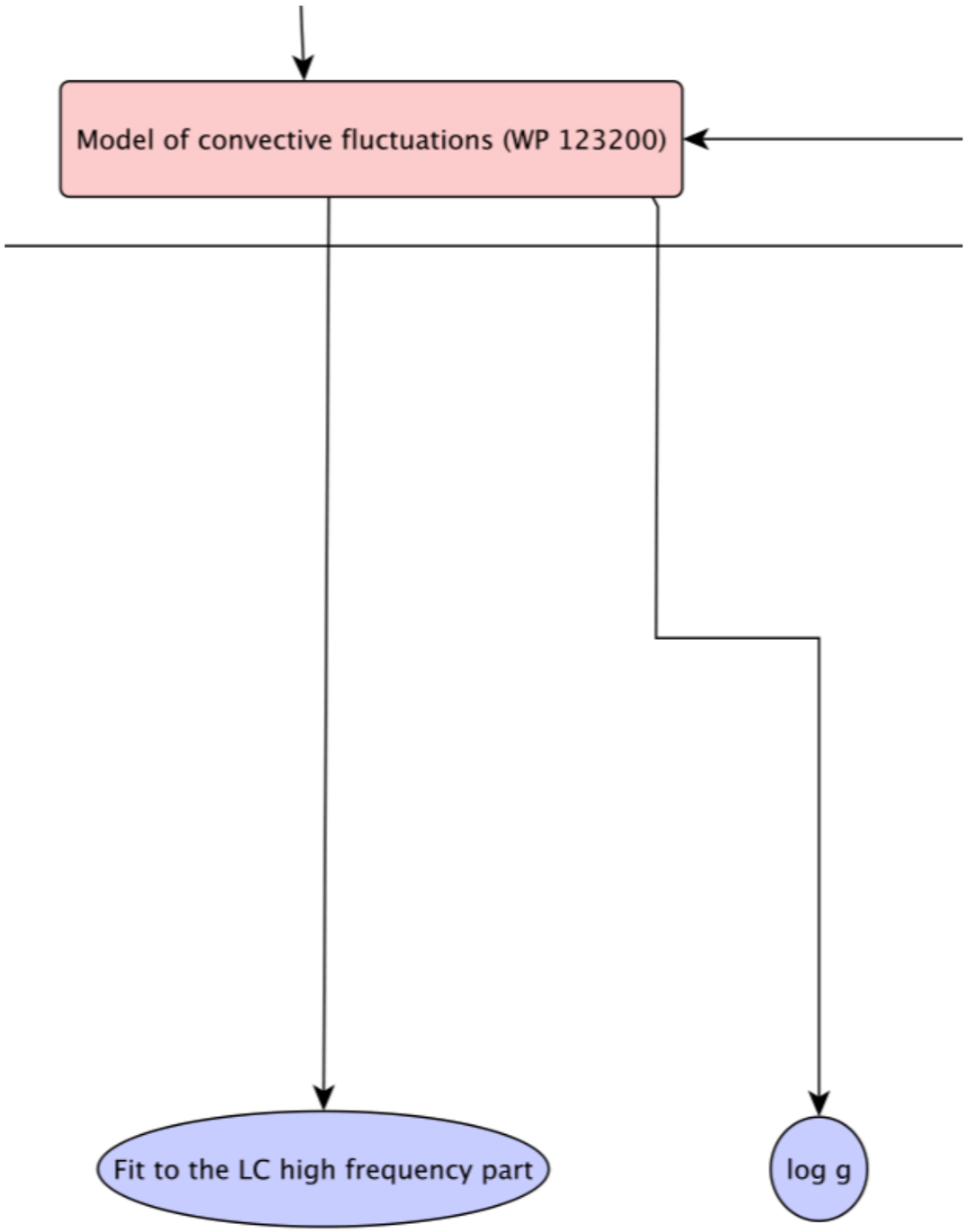

**WP123300**
**Existing laws**
**To be compared with DP5**

**=> NW**
**(No Worries)**

# The pipeline



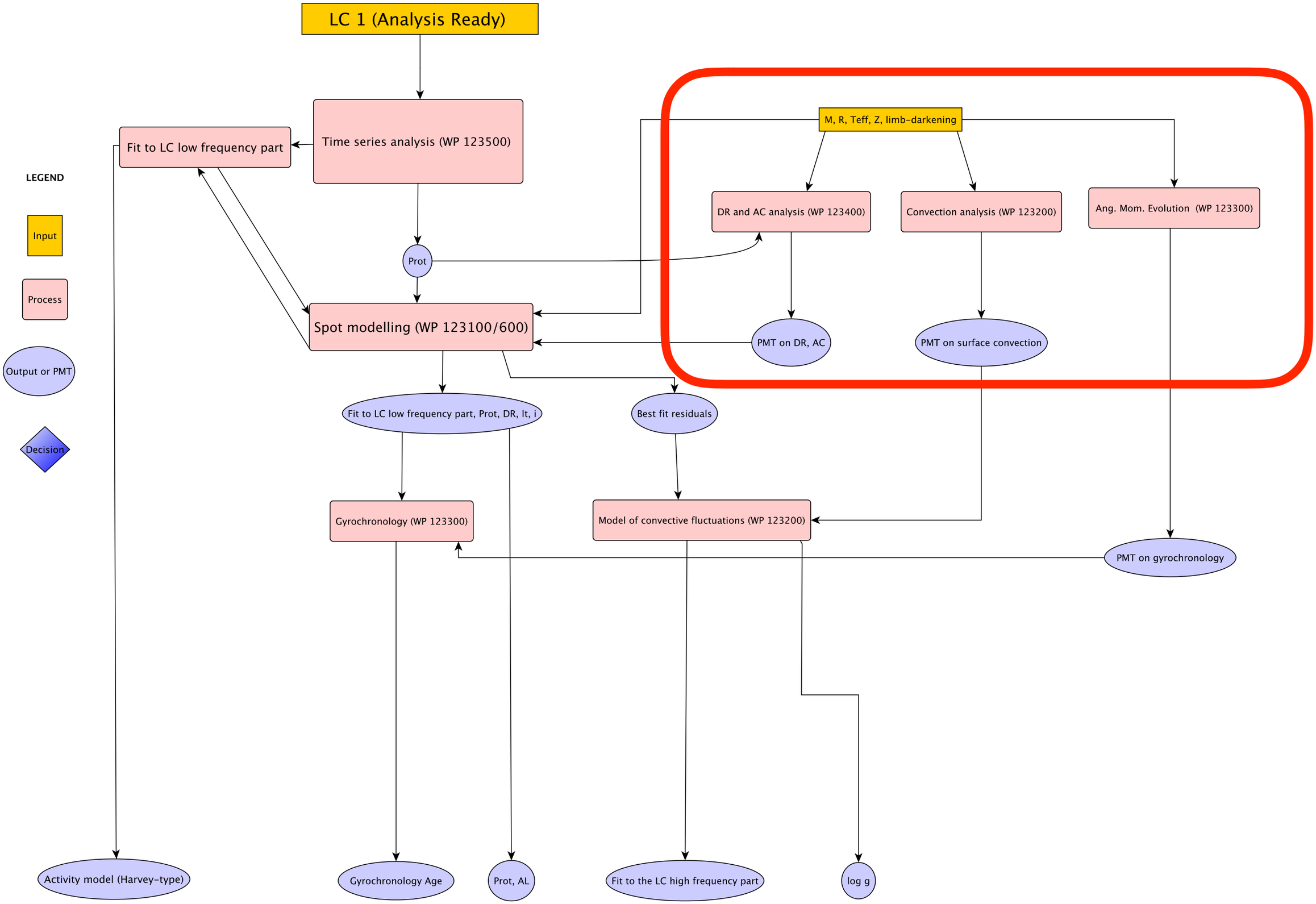
# The pipeline



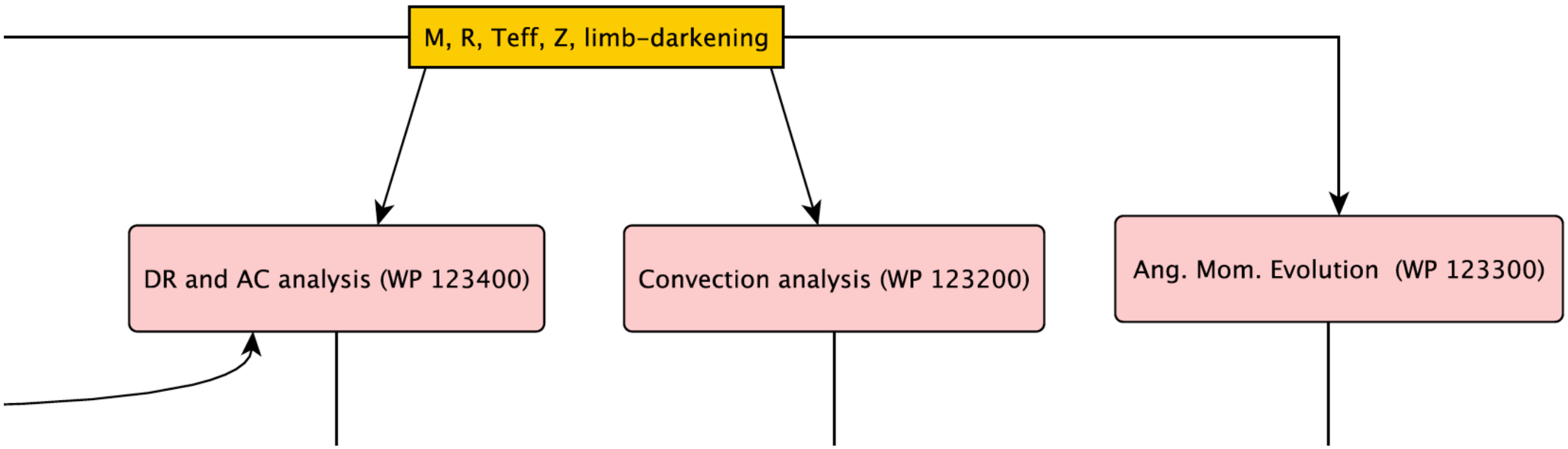

**WP123200**
**Existing models and simulations**
**log(g) to be compared with DP5**

**=> NW**
**(No Worries)**

# The pipeline



# The pipeline




**WP123200/300/400**
**Provide theoretical inputs/guess parameters**
**for other algorithms (differential rotation, cycles)**
**See Antoine Strugarek's presentation (WP123400)**

**=> NW**
**(No Worries)**

# Interactions

- Inclination angle: spot modeling <= mode fitting
- Age: gyrochronology <=> stellar modeling
- log(g): convection model <=> stellar modeling
- Background fitting <=> spectrum fitting

+ interactions with EAS: to be explored

# Conclusion

- Some tasks/DP are tricky (spot modeling)
- Some other look OK
- Interactions to be precised