AOIP
la mesure certifiée

Automatic temperature calibration systems

Calibration report

RS232, IEEE

RS232

Sensors to be calibrated

Reference probe

RS232

IEEE

Temperature source calibration dry-well or bath

Standard thermometer

Multichannel thermometer

www.aoip.com

Operating mode

1 - Drive the temperature source
(dry-well calibrator or calibration bath)

2 - Measure the temperature with the standard thermometer.

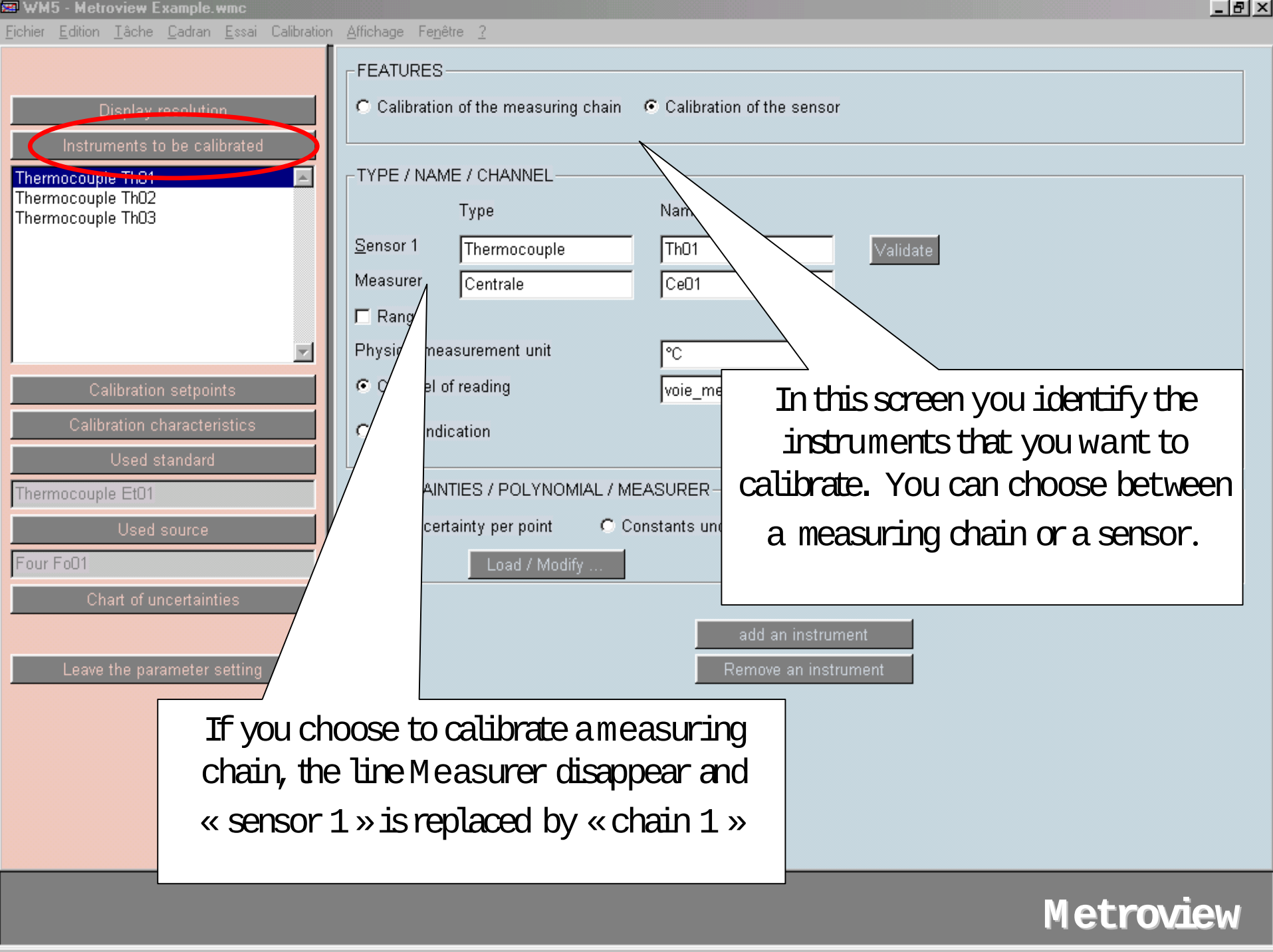
3 - When the temperature is stable, the software saves the measurements of:

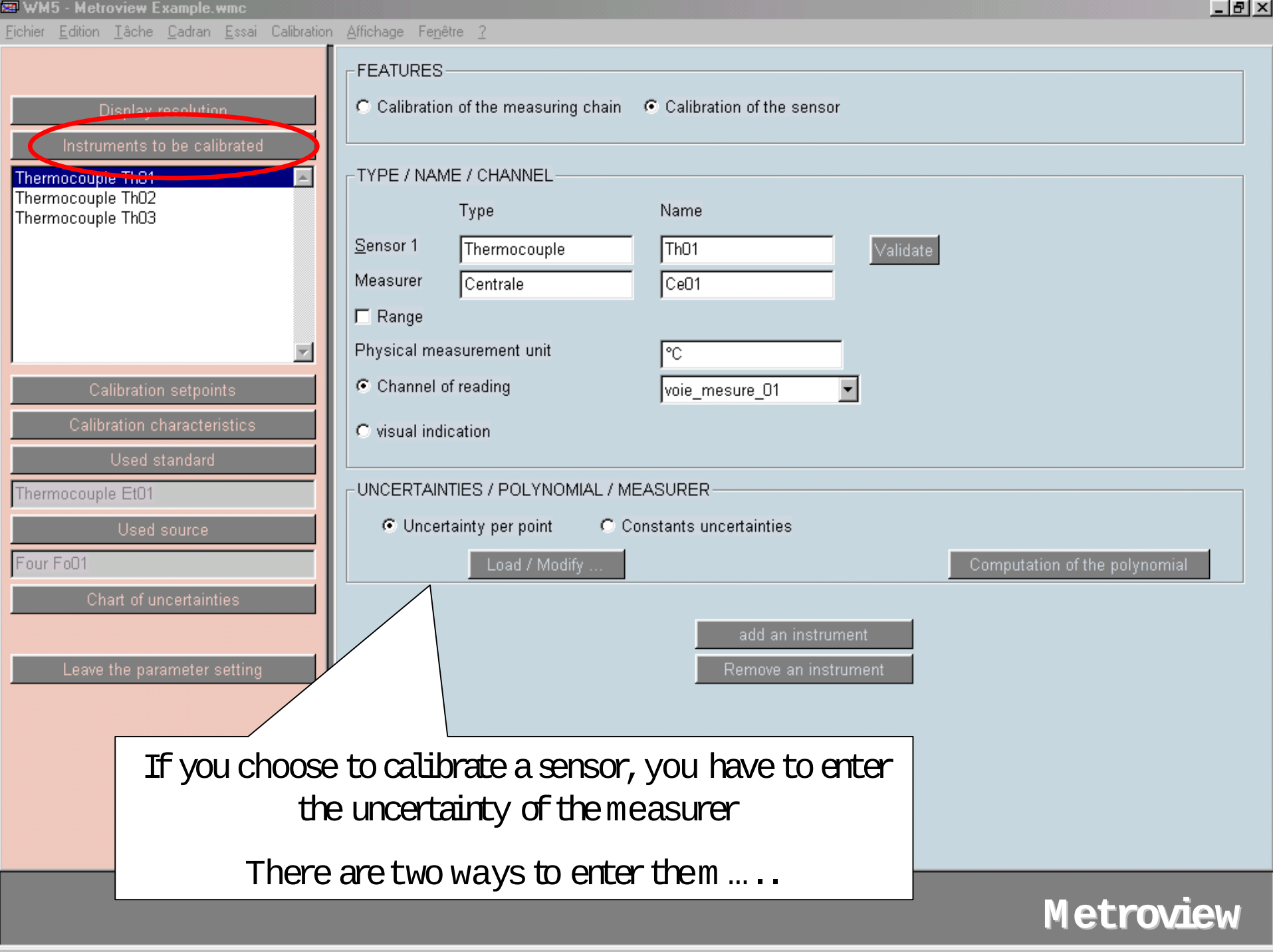
- the reference chain,
- the sensors to be calibrated.

4 - Send the following temperature setpoint.

5 - Calculate the global uncertainty of the calibration.

6 - Edit the calibration report in WORD 2000 version.


WM5 - Metroview Example.wmc
Fichier Edition Tâche Cadran Essai Calibration Affichage Fenêtre ?
Display resolution
Instruments to be calibrated
Thermocouple Th01
Thermocouple Th02
Thermocouple Th03
Calibration setpoints
Calibration characteristics
Used standard
Thermocouple Et01
Used source
Four Fo01
Chart of uncertainties
Leave the parameter setting
FEATURES
Calibration of the measuring chain
Calibration of the sensor
TYPE / NAME / CHANNEL
Type
Sensor 1
Thermocouple
Th01
Validate
Measurer
Centrale
Ce01
°C
voie_me
Load / Modify ...
add an instrument
Remove an instrument
In this screen you identify the instruments that you want to calibrate. You can choose between a measuring chain or a sensor.
If you choose to calibrate a measuring chain, the line Measurer disappear and « sensor 1 » is replaced by « chain 1 »
Metroview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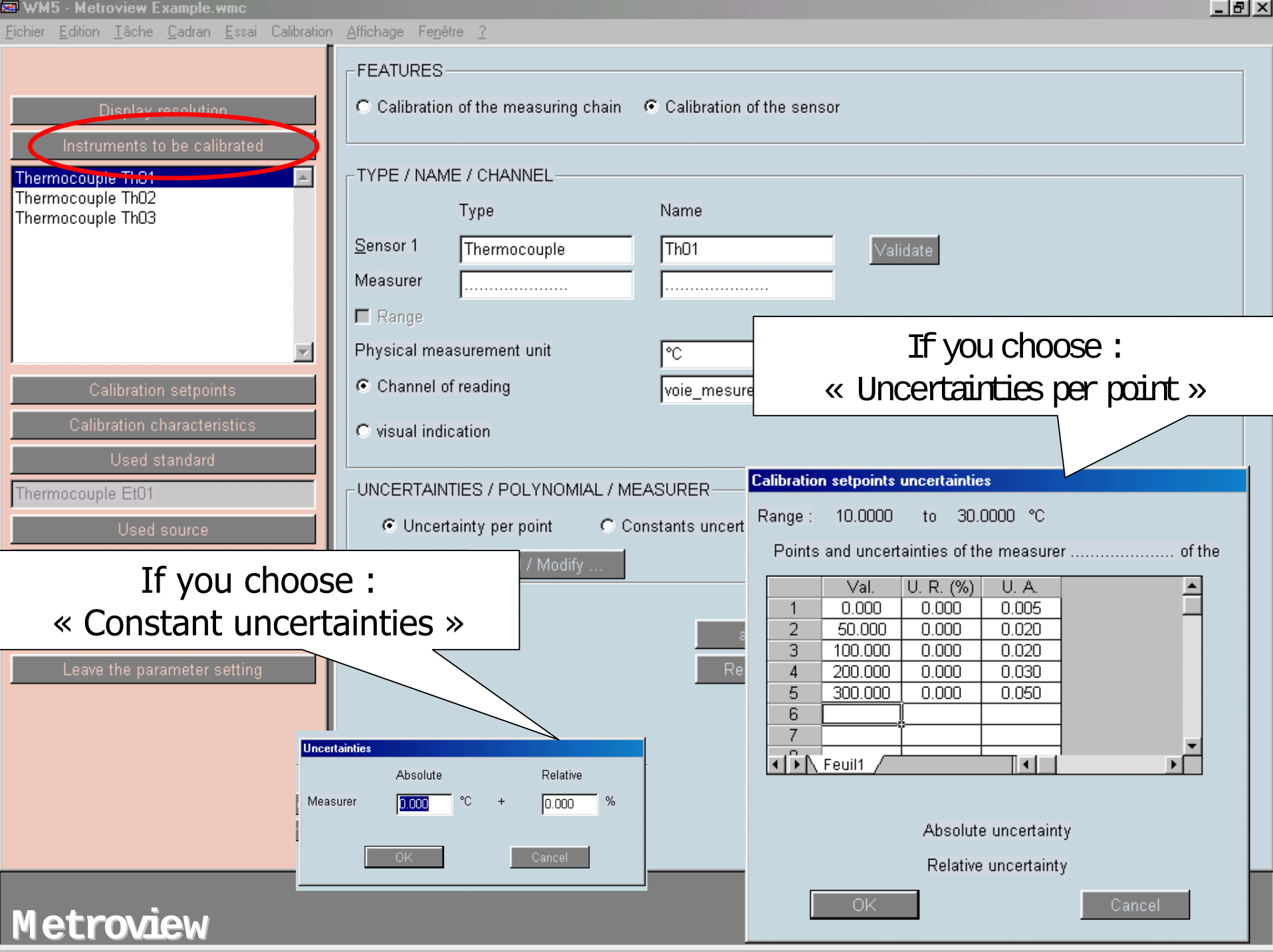
Thermocouple Th02
Thermocouple Th03
Calibration setpoints
Calibration characteristics
Used standard
Thermocouple Et01
Used source
Four Fo01
Chart of uncertainties
Leave the parameter setting
FEATURES
Calibration of the measuring chain
Calibration of the sensor
TYPE / NAME / CHANNEL
Type
Name
Sensor 1
Thermocouple
Th01
Validate
Measurer
Centrale
Ce01
Range
Physical measurement unit
°C
Channel of reading
voie_mesure_01
visual indication
UNCERTAINTIES / POLYNOMIAL / MEASURER
Uncertainty per point
Constants uncertainties
Load / Modify ...
Computation of the polynomial
add an instrument
Remove an instrument
If you choose to calibrate a sensor, you have to enter the uncertainty of the measurer
There are two ways to enter them .....
Metroview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Calibration setpoints
Calibration characteristics
Used standard
Thermocouple Et01
Used source
Leave the parameter setting
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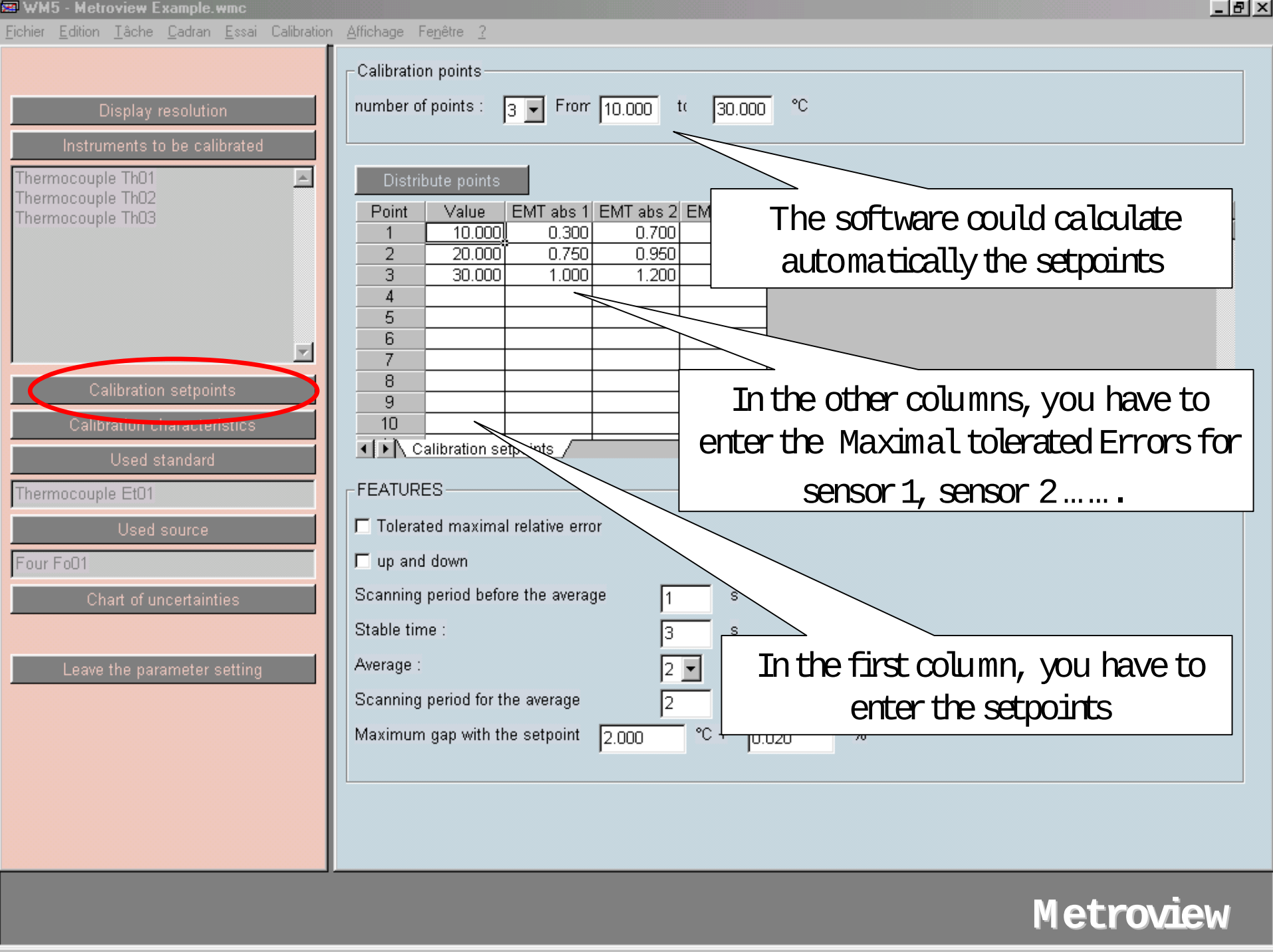
Calibration of the measuring chain
Calibration of the sensor
TYPE / NAME / CHANNEL
Type
Name
Sensor 1
Thermocouple
Th01
Validate
Measurer
Range
Physical measurement unit
°C
Channel of reading
voie_mesure
visual indication
UNCERTAINTIES / POLYNOMIAL / MEASURER
Uncertainty per point
Constants uncert
/ Modify ...
If you choose :
« Uncertainties per point »
Calibration setpoints uncertainties
Range : 10.0000 to 30.0000 °C
Points and uncertainties of the measurer ..... of the
Val.
U. R. (%)
U. A.
1 0.000 0.000 0.005
2 50.000 0.000 0.020
3 100.000 0.000 0.020
4 200.000 0.000 0.030
5 300.000 0.000 0.050
6
7
Feuil1
Absolute uncertainty
Relative uncertainty
OK
Cancel
If you choose :
« Constant uncertainties »
Uncertainties
Absolute
Relative
Measurer
0.000
°C
+
0.000
%
OK
Cancel
Metroview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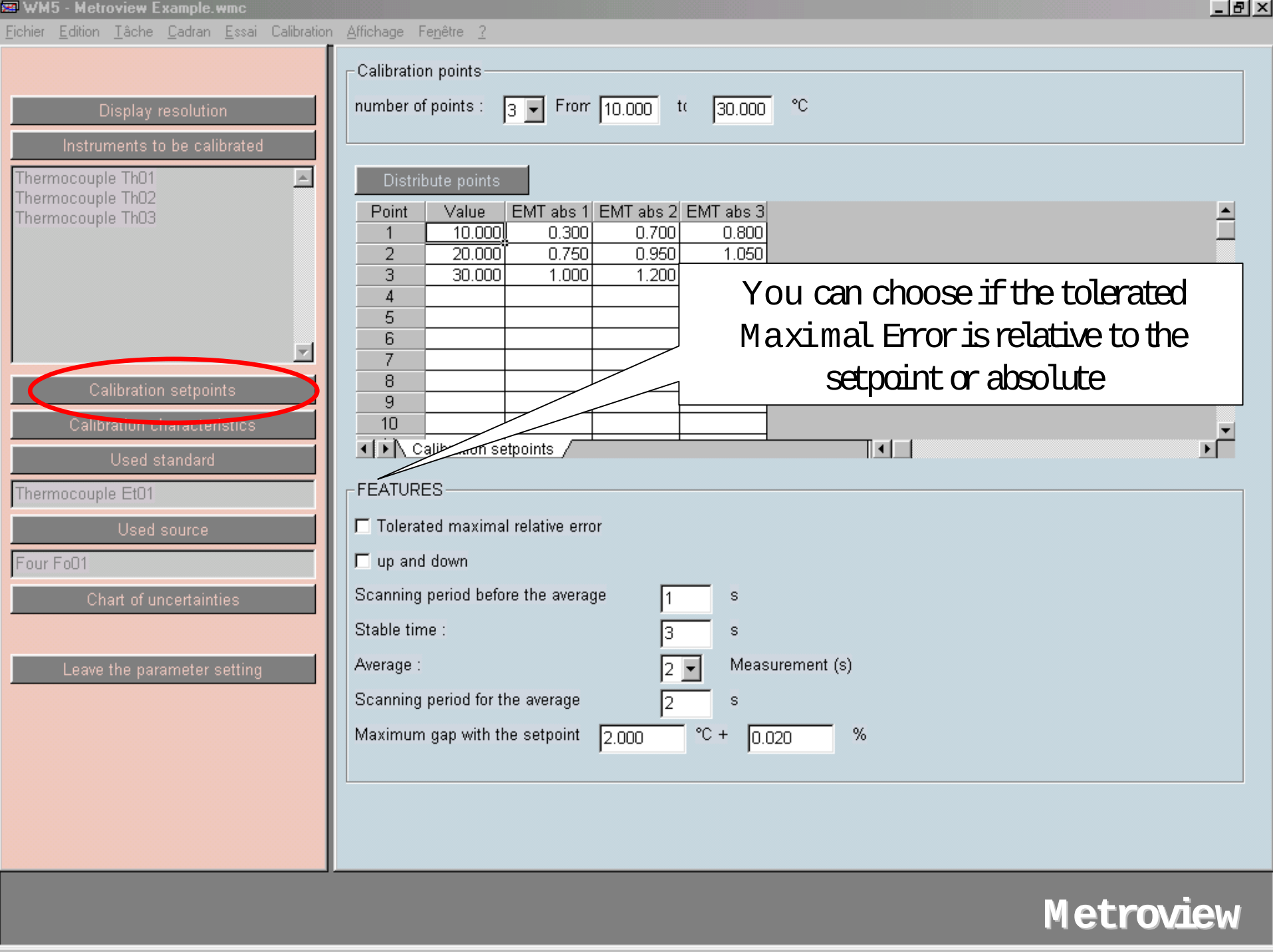
Thermocouple Th02
Thermocouple Th03
Calibration setpoints
Calibration characteristics
Used standard
Thermocouple Et01
Used source
Four Fo01
Chart of uncertainties
Leave the parameter setting
Calibration points
number of points : 3 From 10.000 to 30.000 °C
Distribute points
Point Value EMT abs 1 EMT abs 2 EM
1 10.000 0.300 0.700
2 20.000 0.750 0.950
3 30.000 1.000 1.200
4
5
6
7
8
9
10
Calibration setpoints
FEATURES
Tolerated maximal relative error
up and down
Scanning period before the average 1 s
Stable time : 3 s
Average : 2
Scanning period for the average 2
Maximum gap with the setpoint 2.000 °C
The software could calculate automatically the setpoints
In the other columns, you have to enter the Maximal tolerated Errors for sensor 1, sensor 2 ……
In the first column, you have to enter the setpoints
Metroview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Thermocouple Th02
Thermocouple Th03
Calibration setpoints
Calibration characteristics
Used standard
Thermocouple Et01
Used source
Four Fo01
Chart of uncertainties
Leave the parameter setting
Calibration points
number of points : 3 From 10.000 to 30.000 °C
Distribute points
Point Value EMT abs 1 EMT abs 2 EMT abs 3
1 10.000 0.300 0.700 0.800
2 20.000 0.750 0.950 1.050
3 30.000 1.000 1.200
4
5
6
7
8
9
10
Calibration setpoints
You can choose if the tolerated Maximal Error is relative to the setpoint or absolute
FEATURES
Tolerated maximal relative error
up and down
Scanning period before the average 1 s
Stable time : 3 s
Average : 2 Measurement (s)
Scanning period for the average 2 s
Maximum gap with the setpoint 2.000 °C + 0.020 %
Metroview

WM5 - Metroview Example.wmc

Fichier Edition Tâche Cadran Essai Calibration Affichage Fenêtre ?

Display resolution

Instruments to be calibrated

Thermocouple Th01
Thermocouple Th02
Thermocouple Th03

Calibration setpoints

Calibration characteristics

Used standard

Thermocouple Et01

Used source

Four Fo01

Chart of uncertainties

Leave the parameter setting

Calibration points

number of points : 3 From

Distribute points

Point	Value	EMT abs 1	EMT abs 2	EM
1	10.000	0.300	0.700	
2	20.000	0.750	0.950	
3	30.000	1.000	1.200	1
4				
5				
6				
7				
8				
9				
10				

Calibration setpoints

FEATURES

Tolerated maximal relative error

up and down

Scanning period before the average 1 s

Stable time : 3 s

Average : 2 Measu

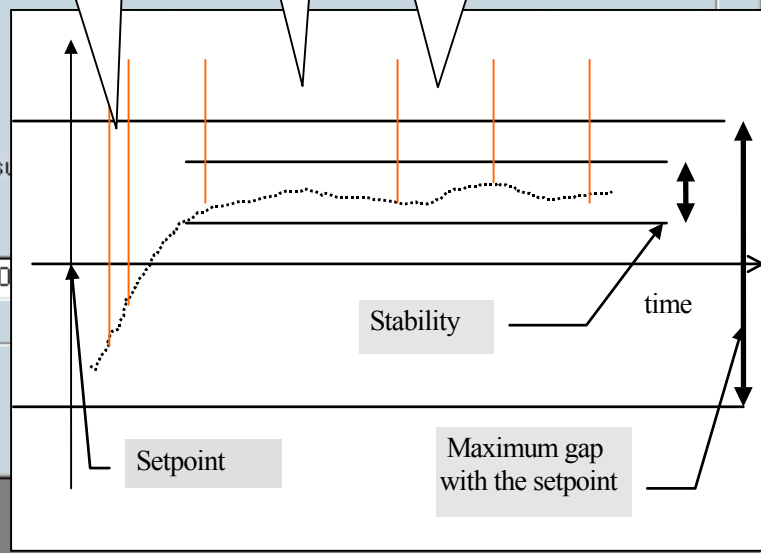
Scanning period for the average 2 s

Maximum gap with the setpoint 2.000 °C + 0.0

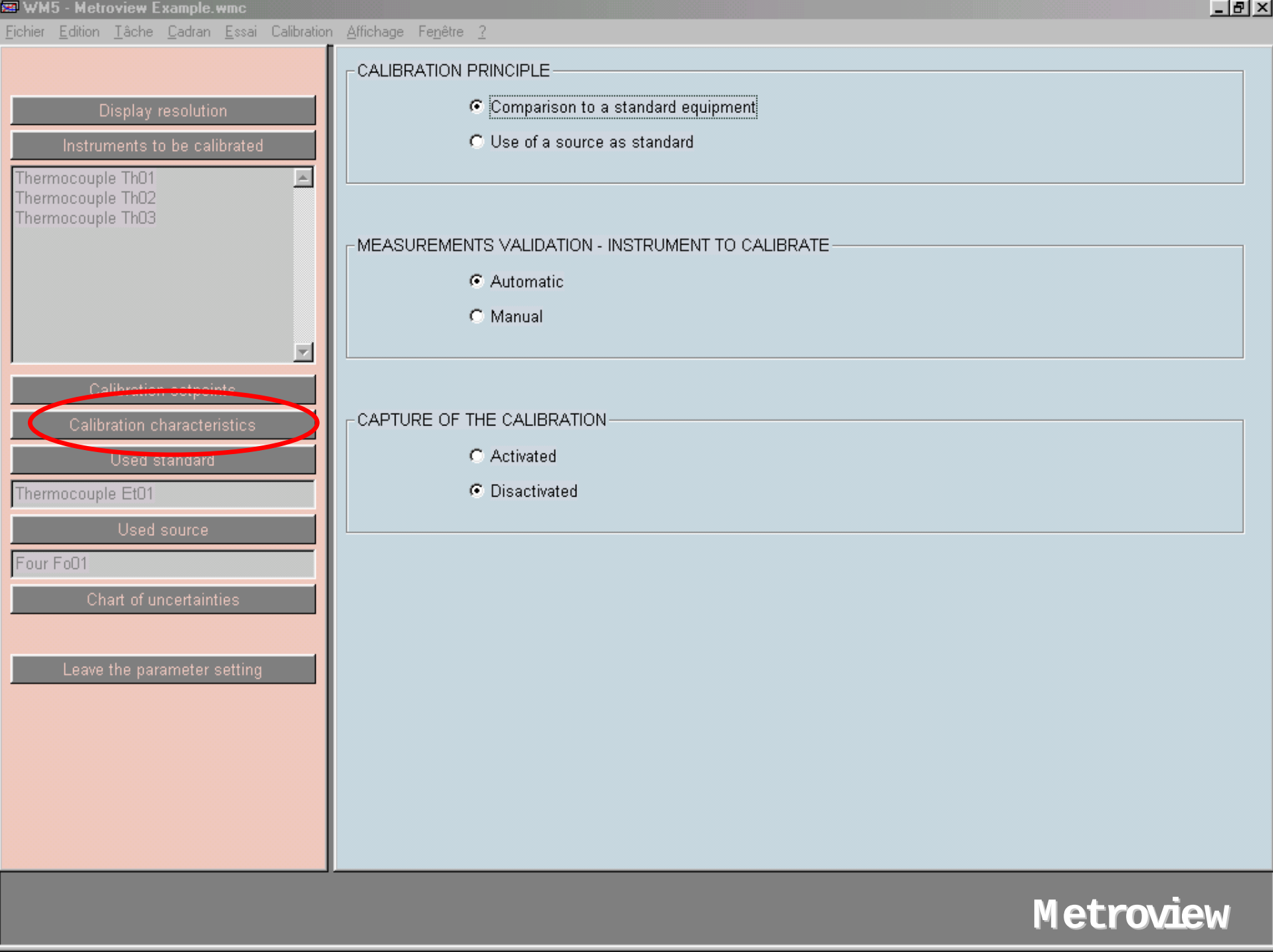
Scanning period before to compute the average value

Scanning period for the average

Stable time



Metroview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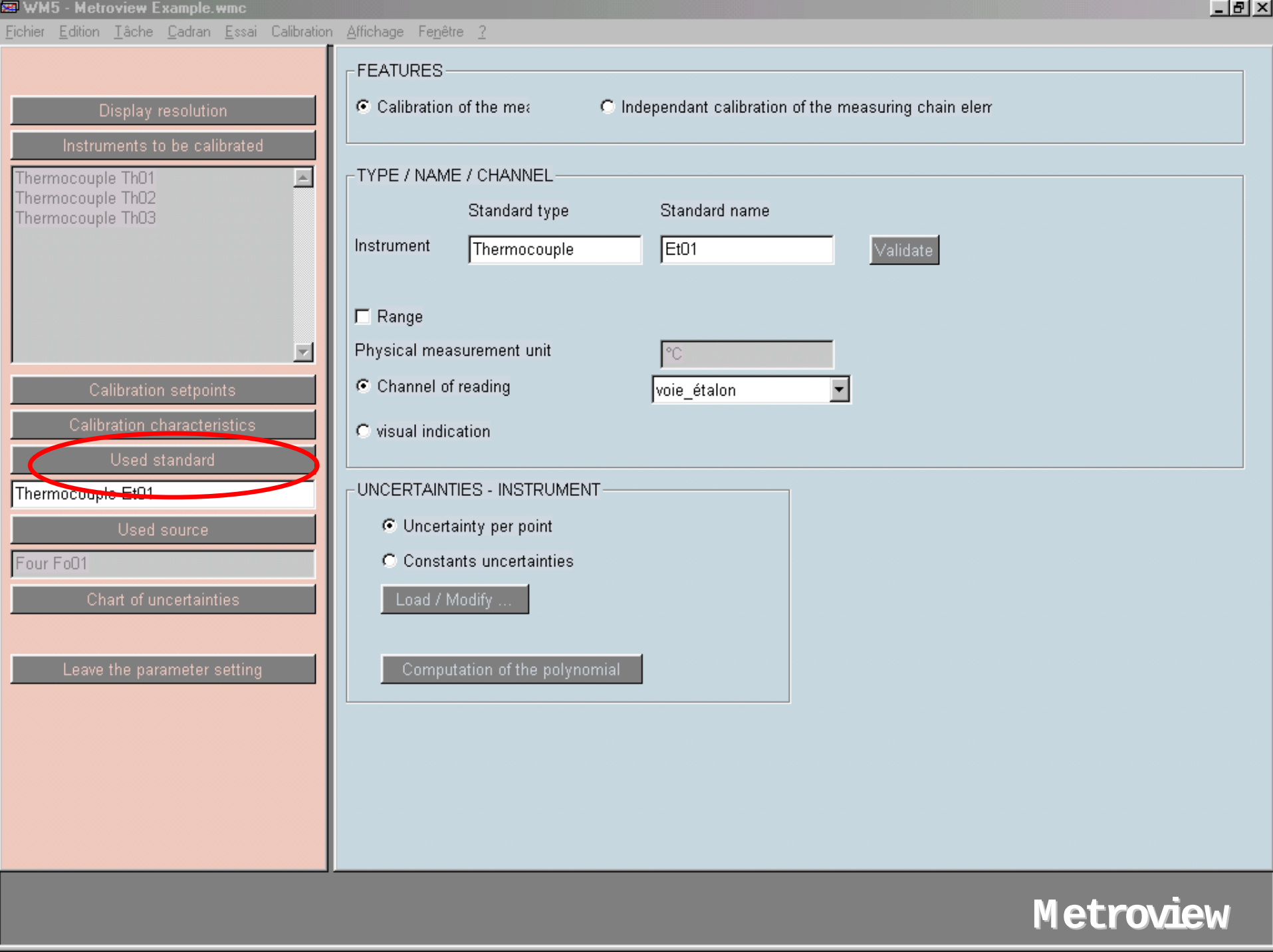
Thermocouple Th03
Calibration setpoints
Calibration characteristics
Used standard
Thermocouple Et01
Used source
Four Fo01
Chart of uncertainties
Leave the parameter setting
CALIBRATION PRINCIPLE
Comparison to a standard equipment
Use of a source as standard
MEASUREMENTS VALIDATION - INSTRUMENT TO CALIBRATE
Automatic
Manual
CAPTURE OF THE CALIBRATION
Activated
Disactivated
Metroview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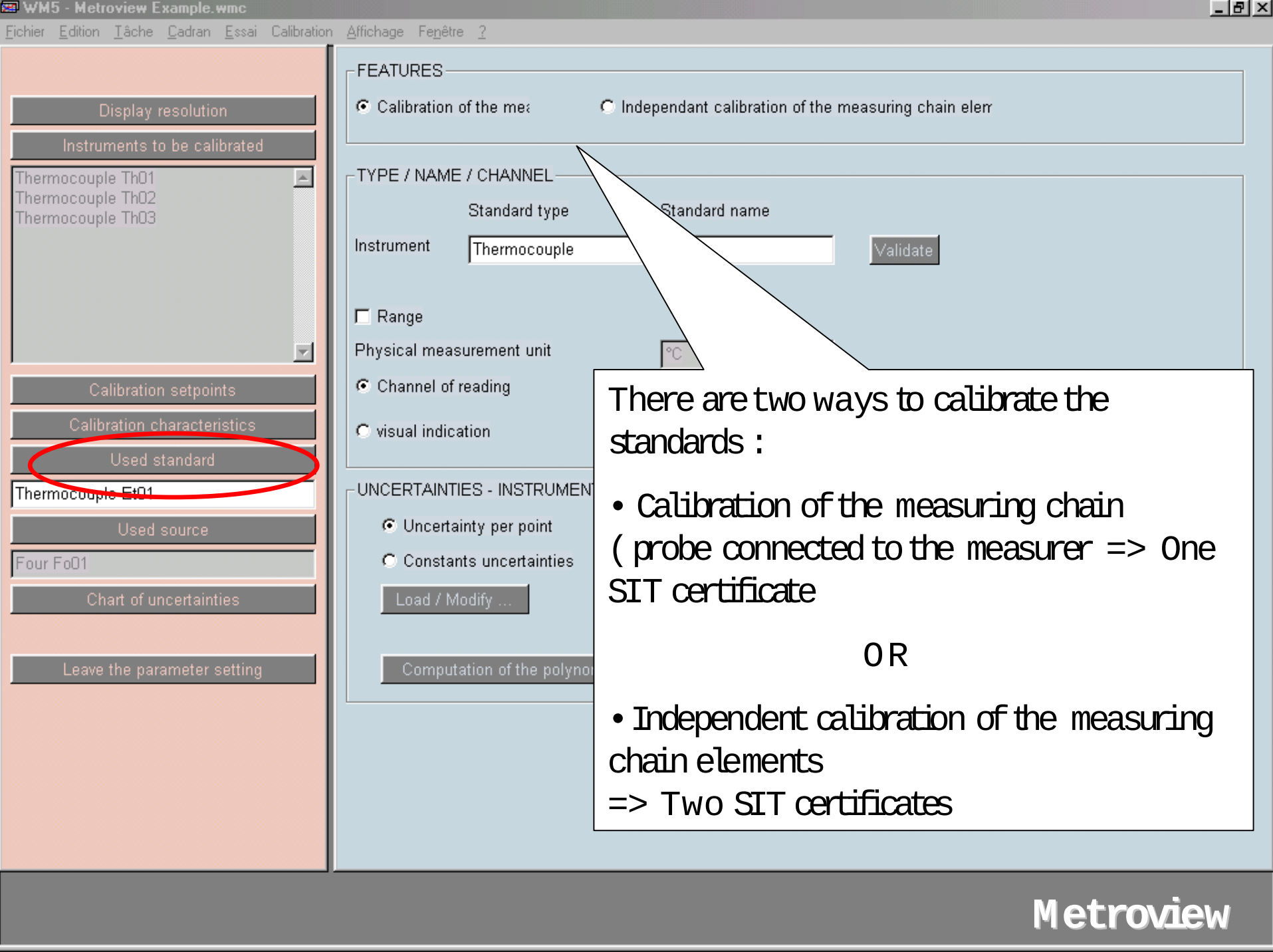
Display resolution
Instruments to be calibrated
Thermocouple Th01
Thermocouple Th02
Thermocouple Th03
Calibration setpoints
Calibration characteristics
Used standard
Thermocouple Et01
Used source
Four Fo01
Chart of uncertainties
Leave the parameter setting
FEATURES
Calibration of the mea
Independant calibration of the measuring chain elem
TYPE / NAME / CHANNEL
Standard type
Standard name
Instrument
Thermocouple
Et01
Validate
Range
Physical measurement unit
°C
Channel of reading
voie_étalon
visual indication
UNCERTAINTIES - INSTRUMENT
Uncertainty per point
Constants uncertainties
Load / Modify ...
Computation of the polynomial
Metroview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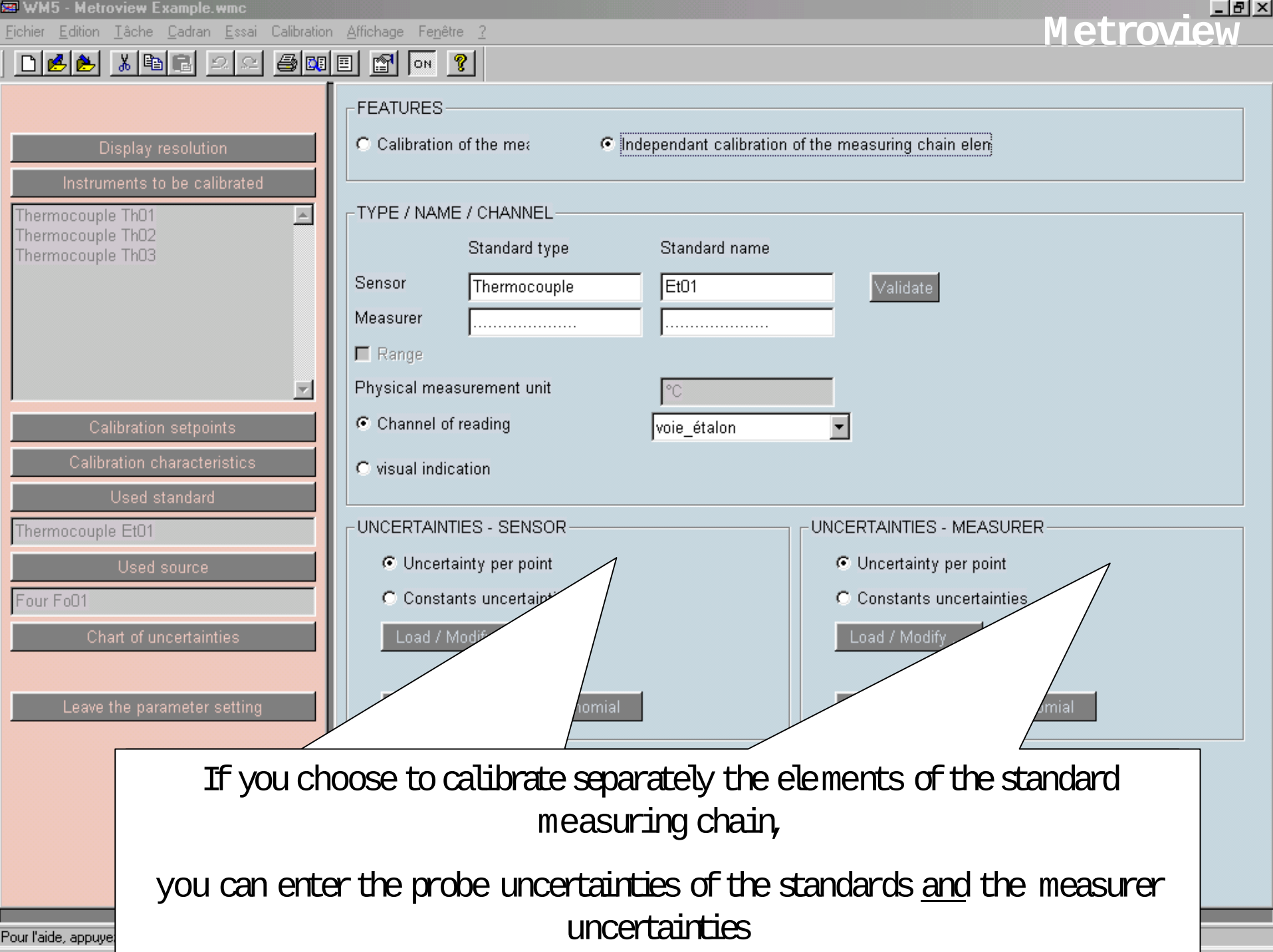
Thermocouple Th02
Thermocouple Th03
Calibration setpoints
Calibration characteristics
Used standard
Thermocouple Et01
Used source
Four Fo01
Chart of uncertainties
Leave the parameter setting
FEATURES
Calibration of the mea
Independant calibration of the measuring chain elem
TYPE / NAME / CHANNEL
Standard type
Standard name
Instrument
Thermocouple
Validate
Range
Physical measurement unit
°C
Channel of reading
visual indication
UNCERTAINTIES - INSTRUMENT
Uncertainty per point
Constants uncertainties
Load / Modify ...
Computation of the polyno
There are two ways to calibrate the standards :
• Calibration of the measuring chain (probe connected to the measurer => One SIT certificate
OR
• Independent calibration of the measuring chain elements
=> Two SIT certificates
Metroview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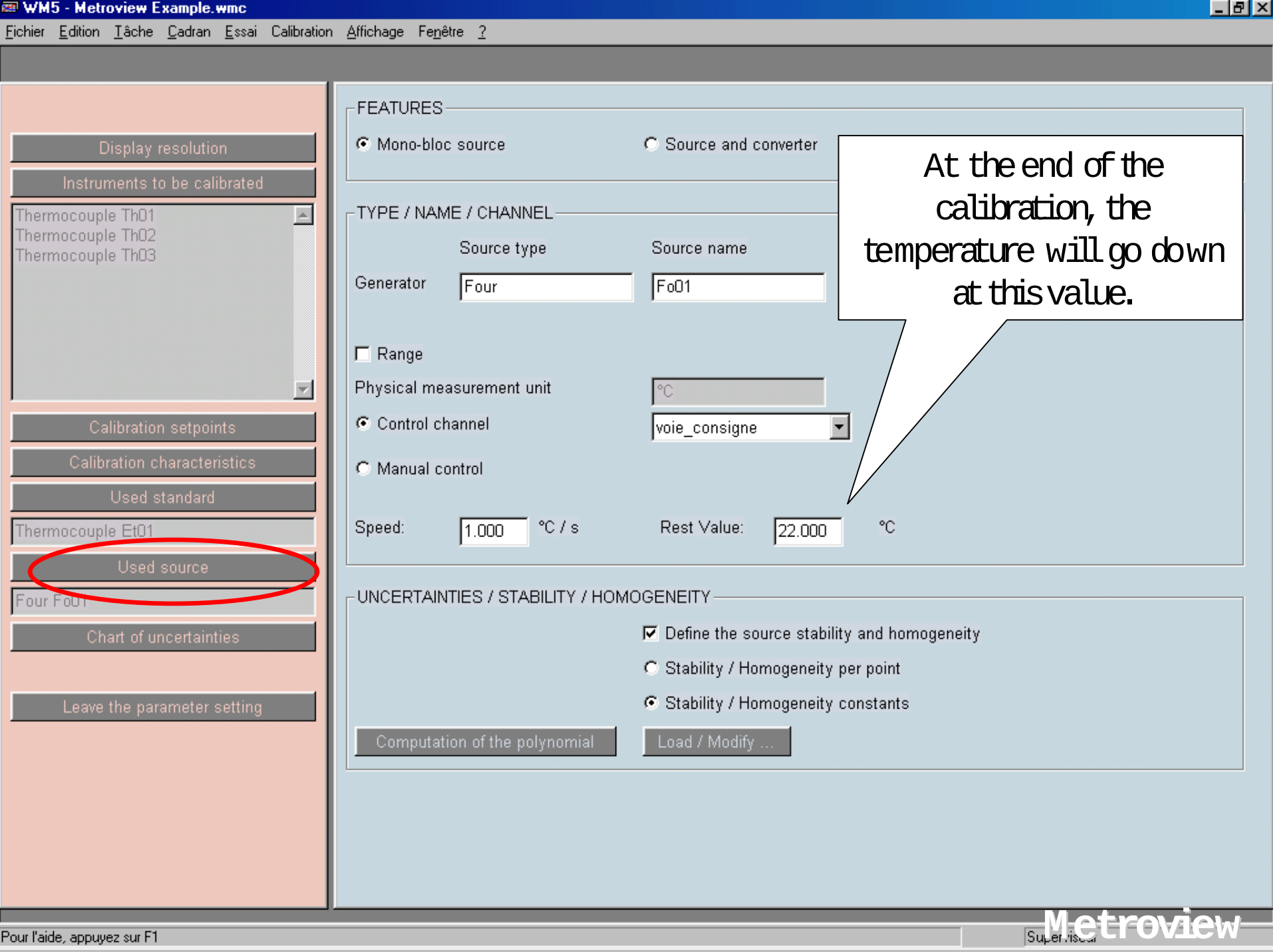
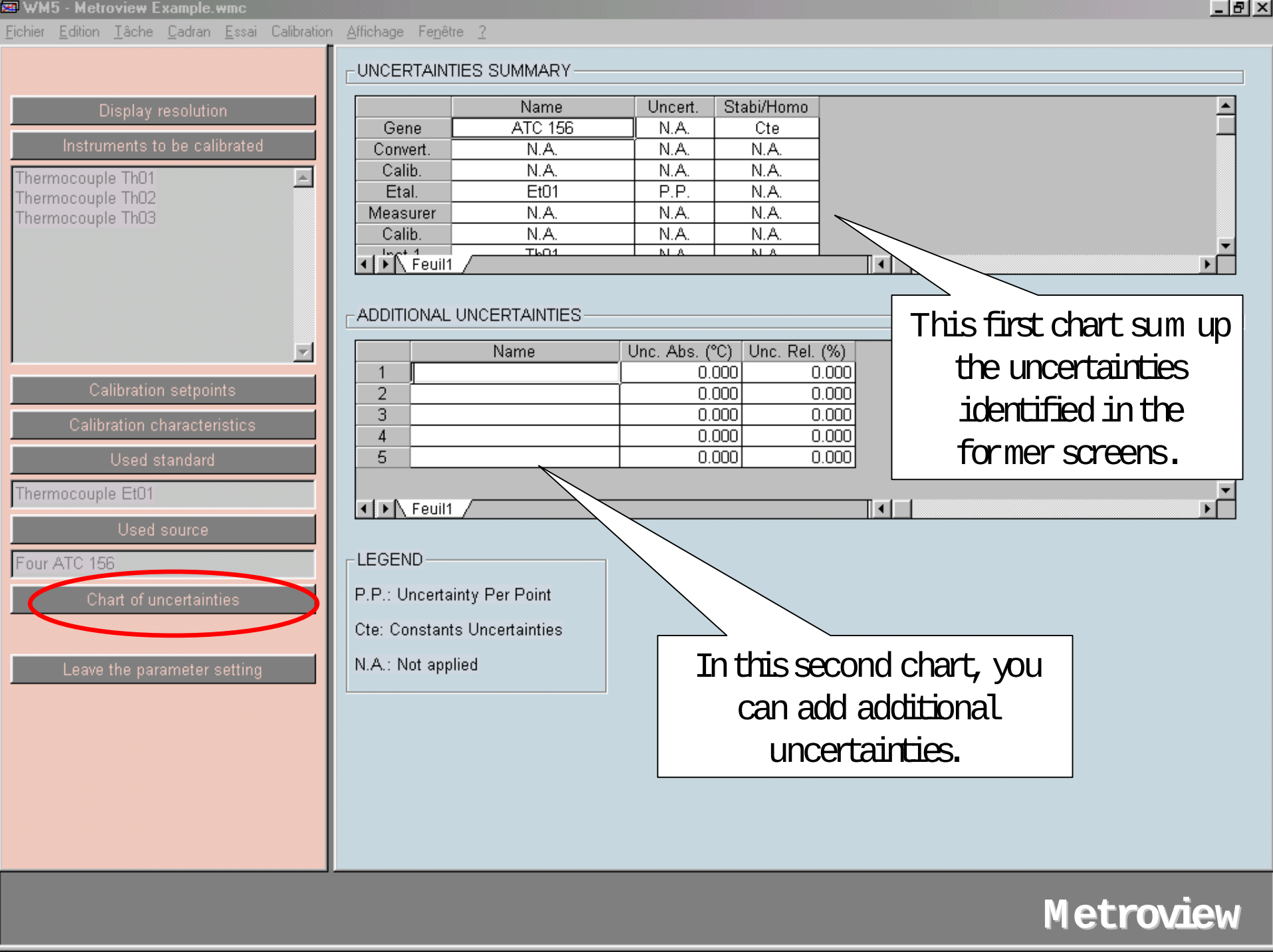
Fichier Edition Tâche Cadran Essai Calibration Affichage Fenêtre ?
Metroview
Display resolution
Instruments to be calibrated
Thermocouple Th01
Thermocouple Th02
Thermocouple Th03
Calibration setpoints
Calibration characteristics
Used standard
Thermocouple Et01
Used source
Four Fo01
Chart of uncertainties
Leave the parameter setting
FEATURES
Calibration of the mea
Independant calibration of the measuring chain elem
TYPE / NAME / CHANNEL
Standard type
Standard name
Sensor
Thermocouple
Et01
Validate
Measurer
Range
Physical measurement unit
°C
Channel of reading
voie_étalon
visual indication
UNCERTAINTIES - SENSOR
Uncertainty per point
Constants uncertaint
Load / Modif
UNCERTAINTIES - MEASURER
Uncertainty per point
Constants uncertainties
Load / Modify
If you choose to calibrate separately the elements of the standard measuring chain,
you can enter the probe uncertainties of the standards and the measurer uncertainties


WM5 - Metroview Example.wmc
Fichier Edition Tâche Cadran Essai Calibration Affichage Fenêtre ?
Display resolution
Instruments to be calibrated
Thermocouple Th01
Thermocouple Th02
Thermocouple Th03
Calibration setpoints
Calibration characteristics
Used standard
Thermocouple Et01
Used source
Four Fo01
Chart of uncertainties
Leave the parameter setting
FEATURES
Mono-bloc source
Source and converter
TYPE / NAME / CHANNEL
Source type
Source name
Generator
Four
Fo01
Range
Physical measurement unit
°C
Control channel
voie_consigne
Manual control
Speed:
1.000
°C / s
Rest Value:
22.000
°C
UNCERTAINTIES / STABILITY / HOMOGENEITY
Define the source stability and homogeneity
Stability / Homogeneity per point
Stability / Homogeneity constants
Computation of the polynomial
Load / Modify ...
At the end of the calibration, the temperature will go down at this value.
Pour l'aide, appuyez sur F1
Metroview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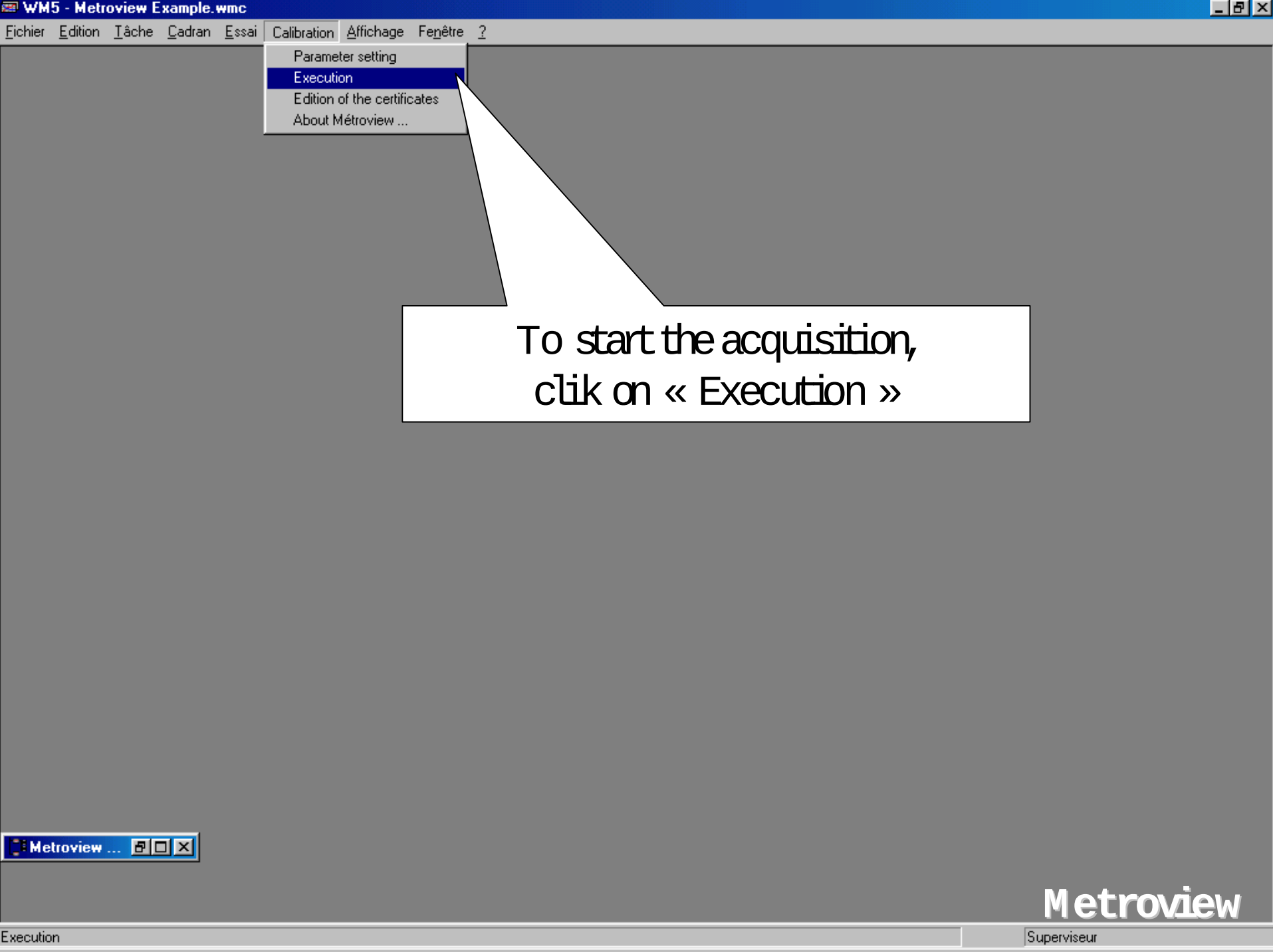
Fichier Edition Tâche Cadran Essai Calibration Affichage Fenêtre ?
Display resolution
Instruments to be calibrated
Thermocouple Th01
Thermocouple Th02
Thermocouple Th03
Calibration setpoints
Calibration characteristics
Used standard
Thermocouple Et01
Used source
Four ATC 156
Chart of uncertainties
Leave the parameter setting
UNCERTAINTIES SUMMARY
Name
Uncert.
Stabi/Homo
Gene
ATC 156
N.A.
Cte
Convert.
N.A.
N.A.
N.A.
Calib.
N.A.
N.A.
N.A.
Etal.
Et01
P.P.
N.A.
Measurer
N.A.
N.A.
N.A.
Calib.
N.A.
N.A.
N.A.
Feuil1
ADDITIONAL UNCERTAINTIES
Name
Unc. Abs. (°C)
Unc. Rel. (%)
1
2
3
4
5
0.000
Feuil1
LEGEND
P.P.: Uncertainty Per Point
Cte: Constants Uncertainties
N.A.: Not applied
This first chart sum up the uncertainties identified in the former screens.
In this second chart, you can add additional uncertainties.
Metroview


WM5 - Metroview Example.wmc
Fichier
Edition
Tâche
Cadran
Essai
Calibration
Affichage
Fenêtre
?
Parameter setting
Execution
Edition of the certificates
About Métroview ...
To start the acquisition,
clik on « Execution »
Metroview ...
Metroview
Execution
Superviseur

WM5 - Metroview Example.wmc

Fichier Edition Tâche Cadran Essai Calibration Affichage Fenêtre ?

Metroview

Calibration configuration in progress

Instrument calibrated by	:	Instrument - Standard
Source used (Type / Name)	:	Four / Fo01
Driving of the source	:	Automatic
Setpoints validation	:	If possible automatic

Display measurements

01-05

Action

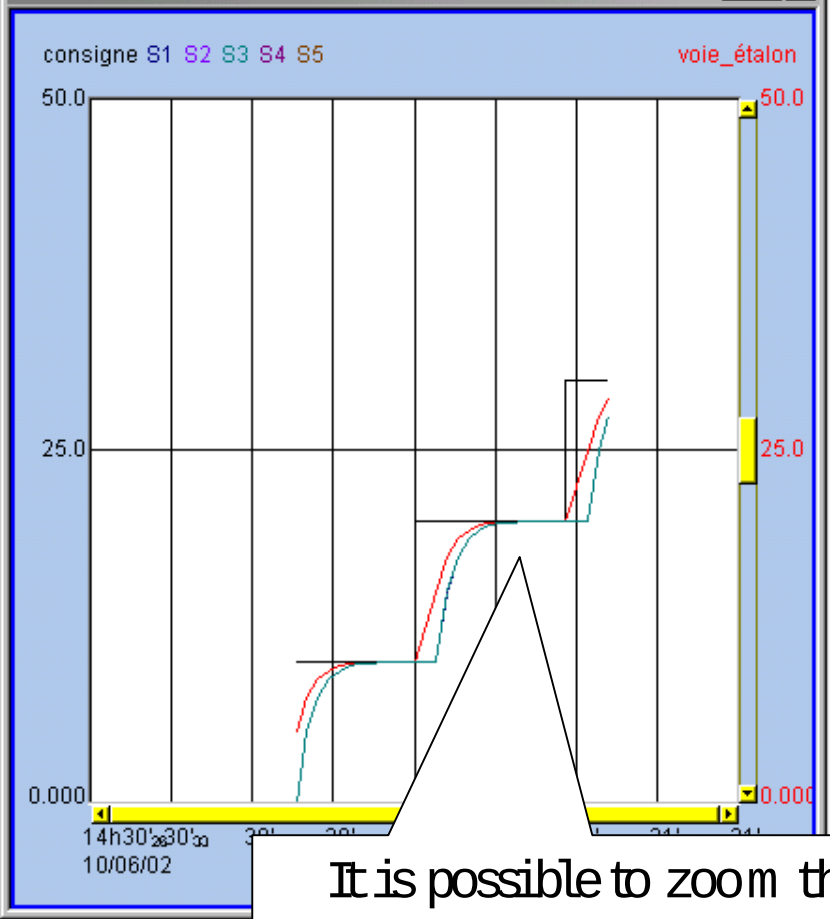
Calibration in progress : setpoint 30.0000°C

Point n° 3

Detection of the stability in progress :

>>>>>>>>>>>>>>>

panneau_1



Calibration setpoints

Calibration of 3 instrument(s)

Sens croissant — Measurer : Automatic

Point	Value	Standard
N° 1	10.000	9.990
		9.996
Moy.		9.993
N° 2	20.000	19.997
		19.998
Moy.		19.997
N° 3	30.000	28.752
Moy.		

	Th01	Th02	Th03
N° 1	9.98	9.99	10.00
	10.00	10.00	10.00
Moy.	9.99	10.00	10.00
N° 2	20.01	20.01	20.00
	20.01	20.01	20.00
Moy.	20.01	20.01	20.00
N° 3	27.50	27.51	27.50
Moy.			

Feuil1

Standard measuring chain

Setpoints

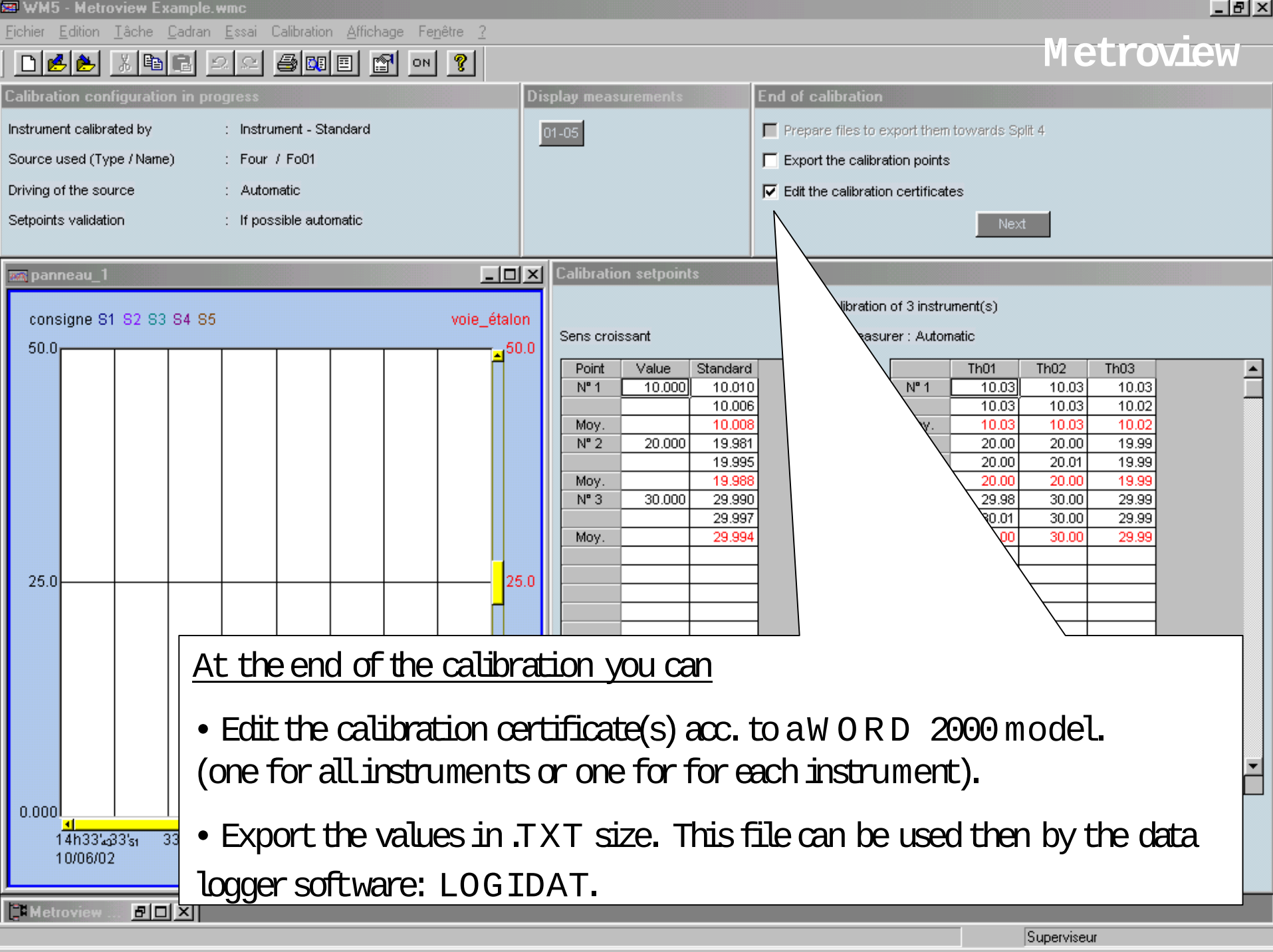
It is possible to zoom the graph

Instruments under calibration.
The red value is the average.

Metroview ...

Pour l'aide, appuyez sur F1

Superviseur



At the end of the calibration you can

- Edit the calibration certificate(s) acc. to a WORD 2000 model. (one for all instruments or one for for each instrument).
- Export the values in .TXT size. This file can be used then by the data logger software: LOGIDAT.