ＣＴＲソフトウエアによる極点図の平滑化

平滑化は測定データを変形させています。
通常データや特殊データでシュミレーションしてみました。
お使いのソフトウエアで確認してみてください。
データによっては、特に、極点図の中心が大きく変形しています。

https://geocities.yahoo.co.jp/helpertex2 サイトはドキュメントで容量 95%以上の為
ソフトウエアがアップ出来なくなっています。
ソフトウエアが必要の場合、メールで直接請求してください。

２０１８年０７月０１日
ＨｅｌｐｅｒＴｅｘ　Ｏｆｆｉｃｅ
odftex@ybb.ne.jp
山田　義行

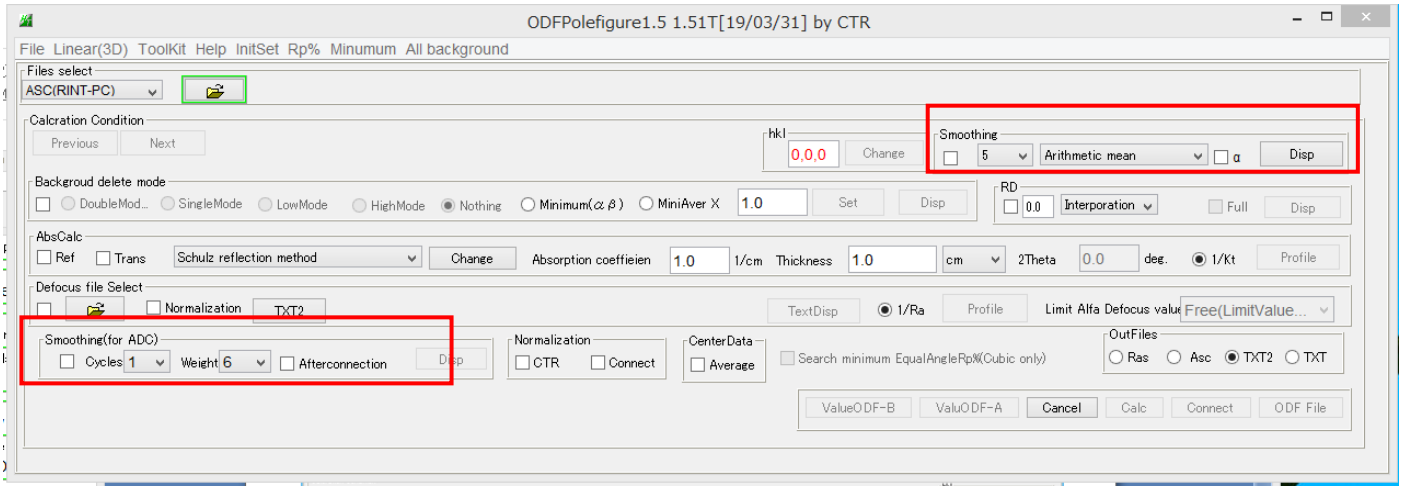
概要

極点処理では粒径の粗いデータなどでは平滑化が行われている。
しかし、平滑化の結果、データにダメージが発生する事もあります。ご利用しているソフトウエアの平滑化を理解し、ご利用下さい。

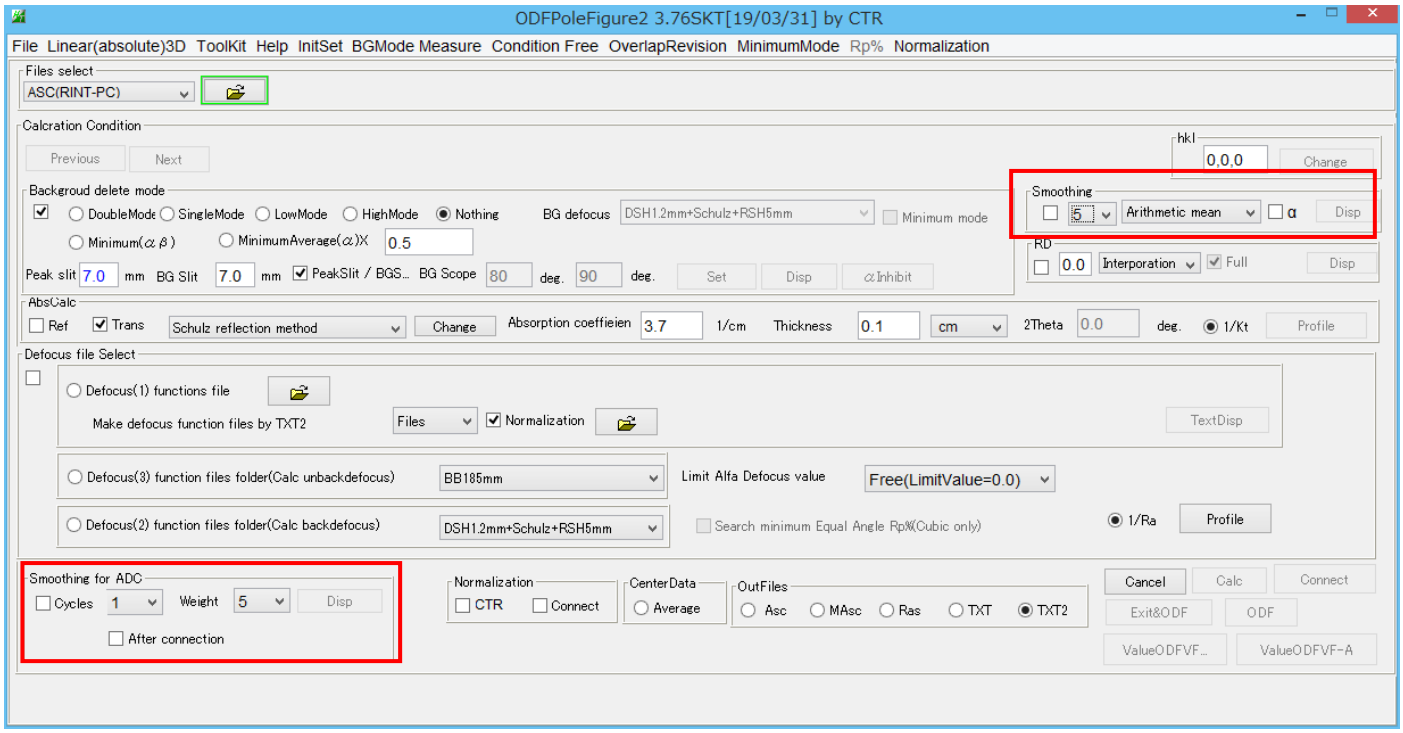
ＣＴＲソフトウエアでは平滑化の手法を結果ファイル名に反映されています。
２０１８年０７月０１日現在のファイル名を説明します。

ソフトウエア

ODFPoleFigure1.5(Ver.1.51)



ODFPoleFigure2(Ver.3.76)

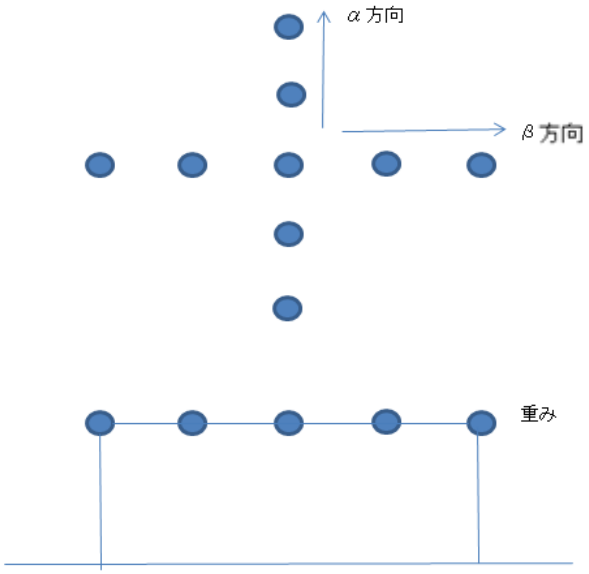


PoleFigureProfile.jar(Ver.1.03)ソフトウエアで評価しています。

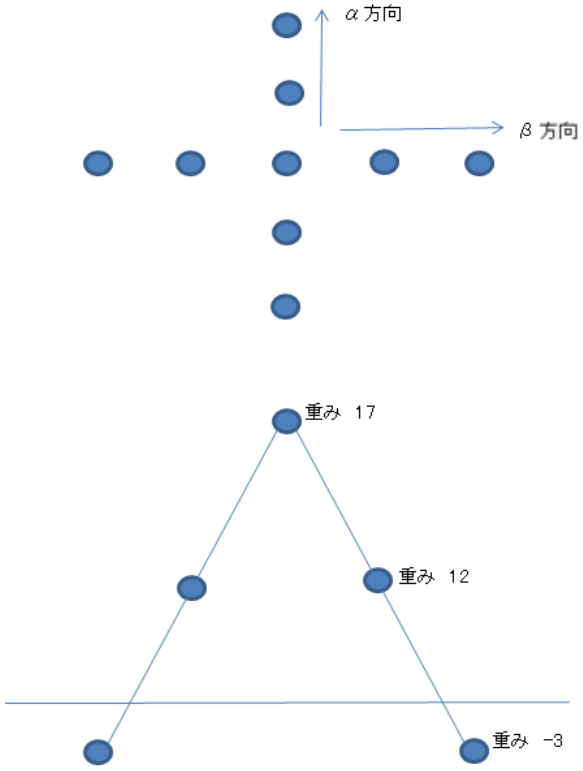
各平滑化のパラメータと動作

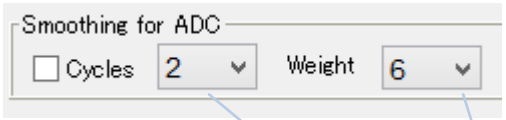
平滑化５点の重み（終端にデータ３点を外挿）

Arithmetic mean

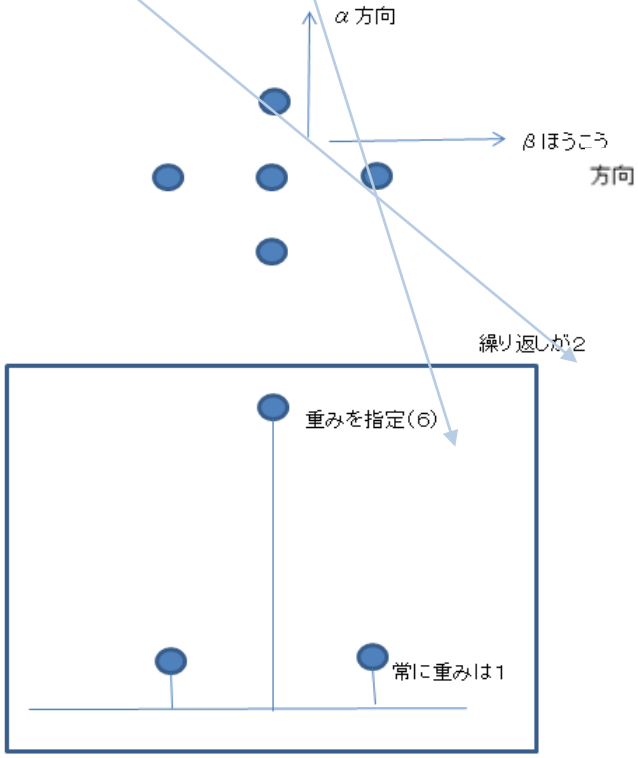


Savitzky-Golay mean





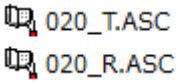
終端にデータ１点を外挿



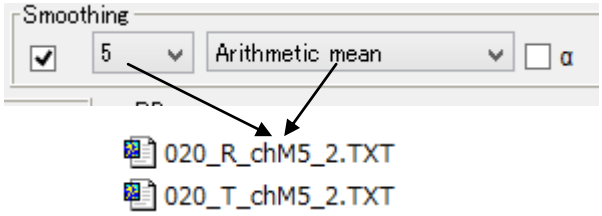
ADC では測定されていないデータの外挿は常に１点で、他の平滑化より有利である事が分かります。

平滑化手法と作成されるファイル名

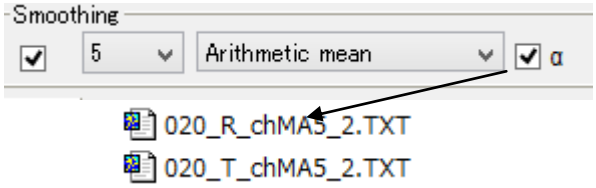
入力データ



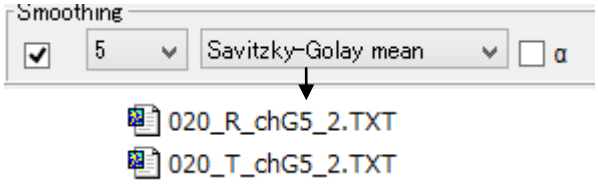
単純移動平均（β方向）



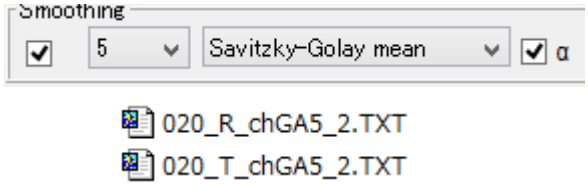
単純移動平均（α、β方向）



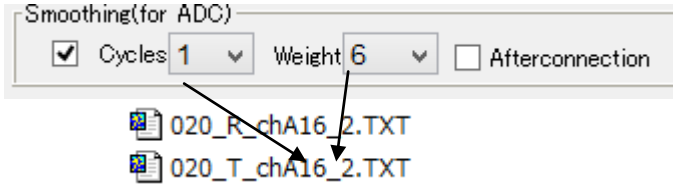
重み付き移動平均（β方向）



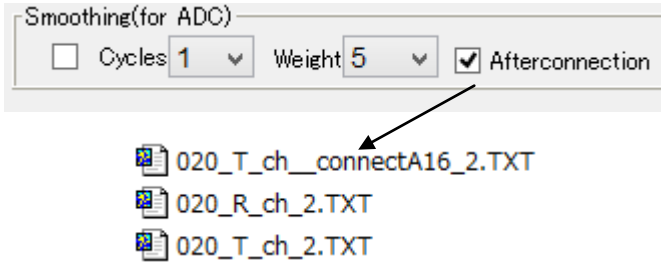
重み付き移動平均（α、β方向）



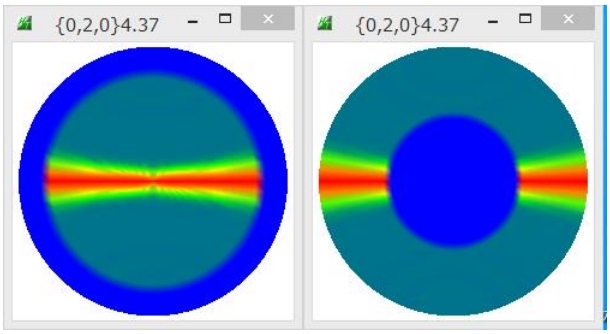
繰り返し重み付き移動平均（α、β方向）

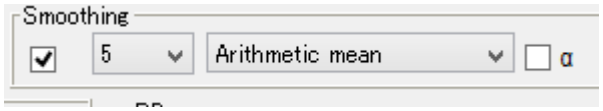


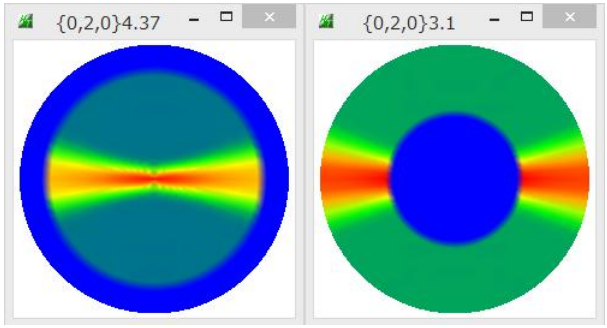
透過反射データ接続後、繰り返し重み付き移動平均（α、β方向）

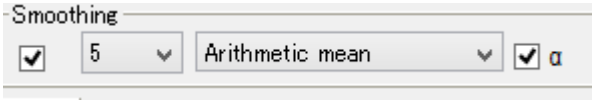


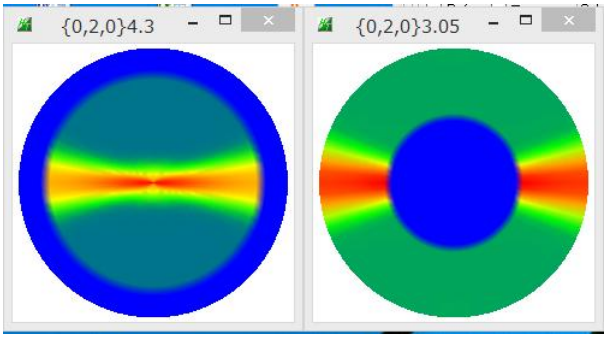
通常のデータ（Ｆｉｂｅｒ）による平滑化

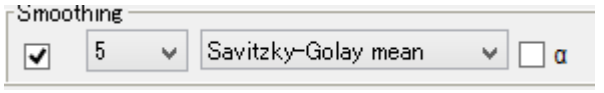


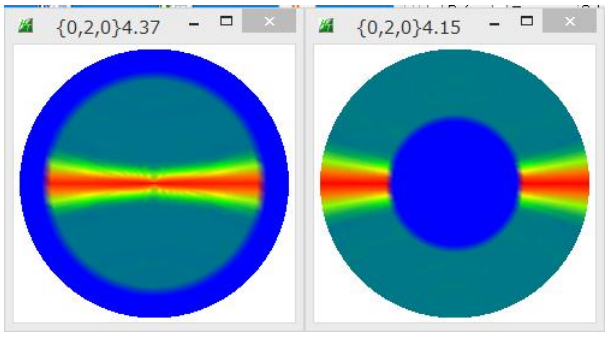


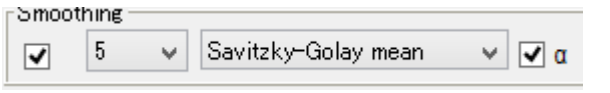


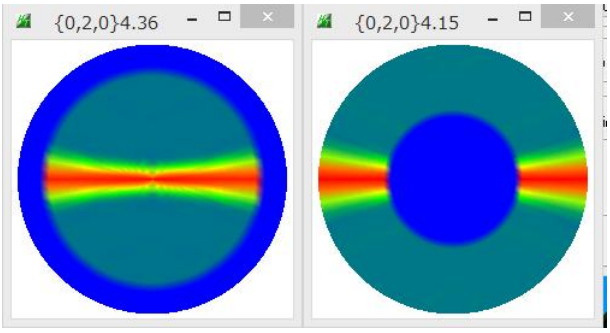


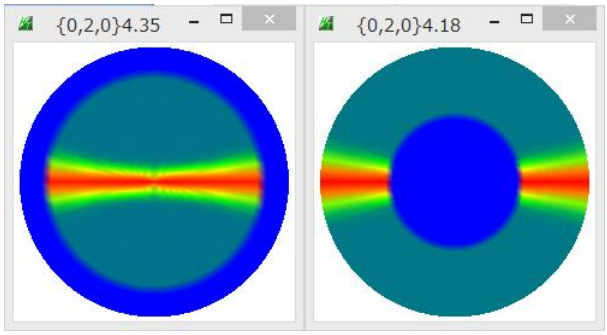


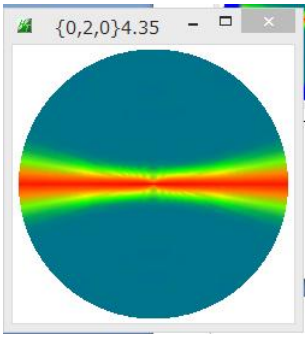






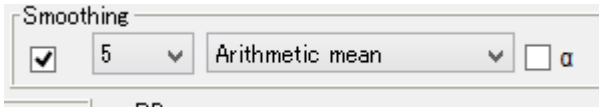


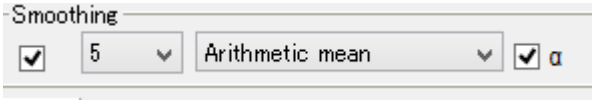


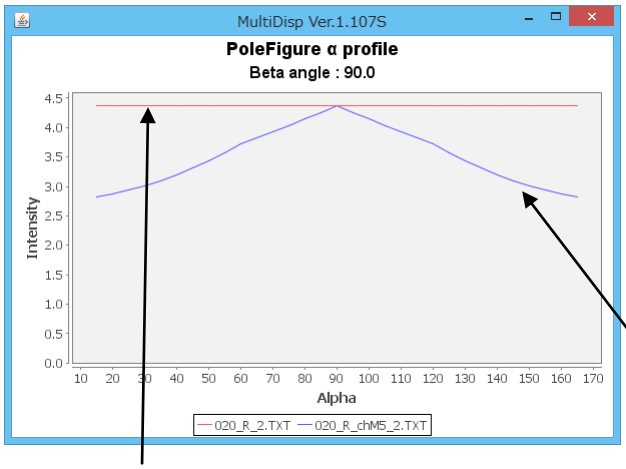


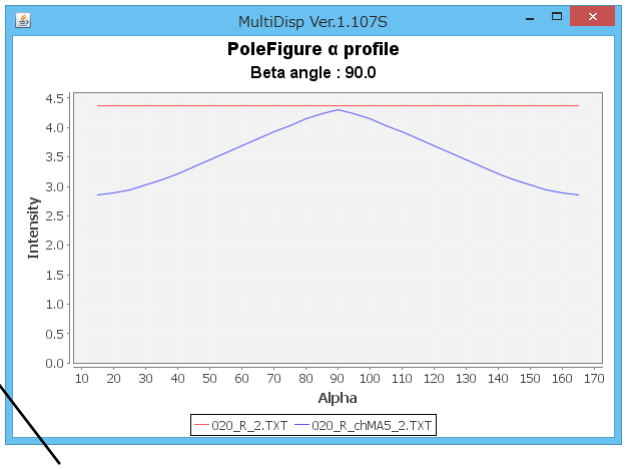
反射データでβ=90->270 のプロファイルを確認してみます。

反射法の表示

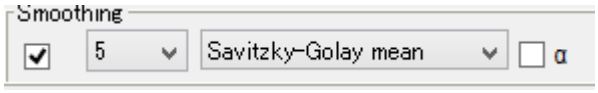


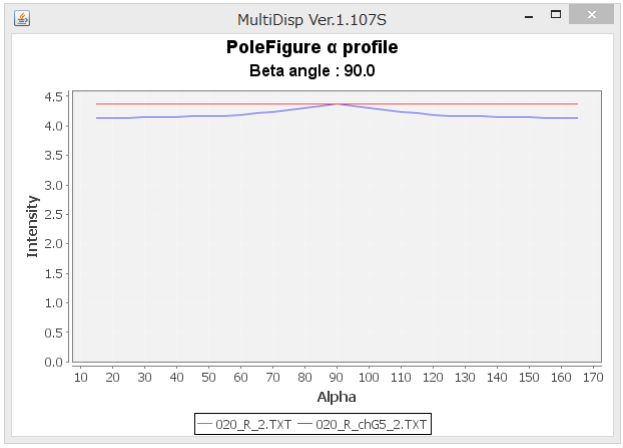


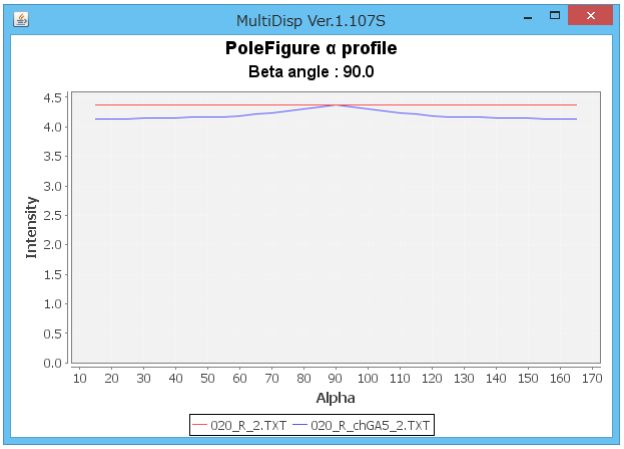


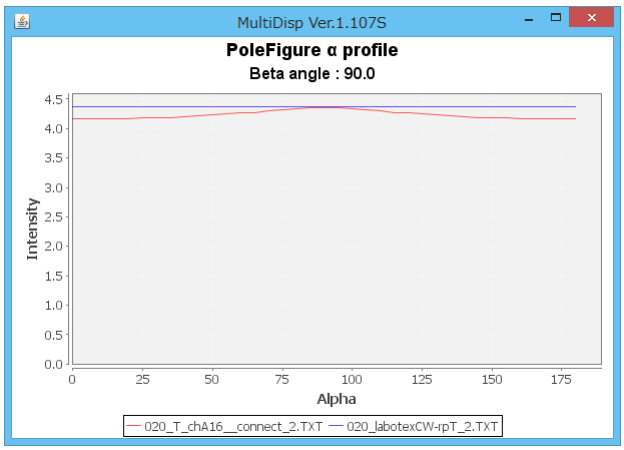


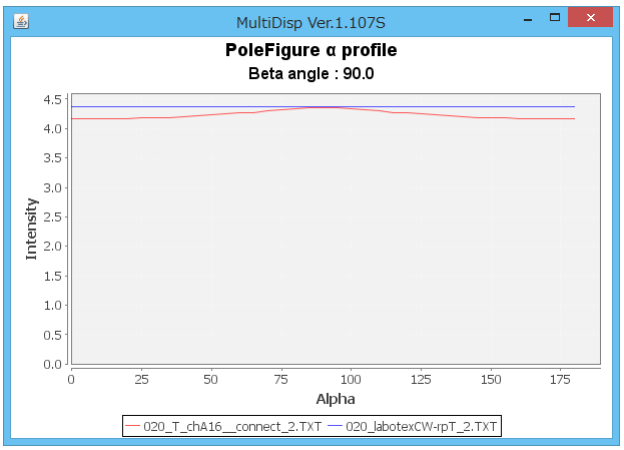
赤は平滑化前の β＝90->270 のプロファイル　青は平滑化後



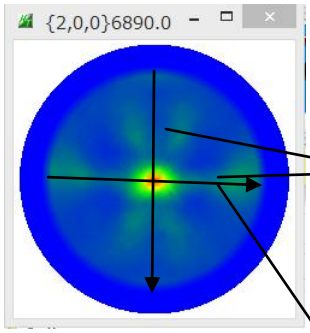


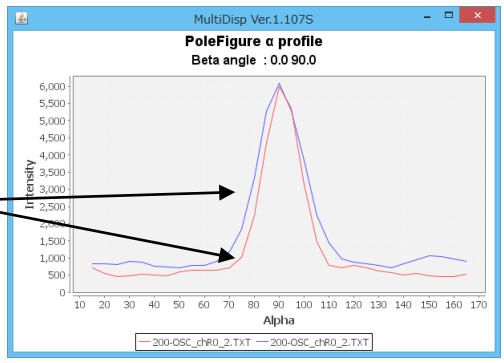


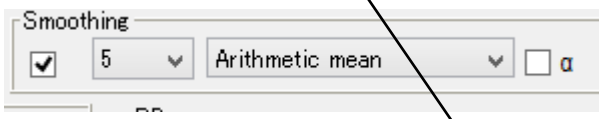


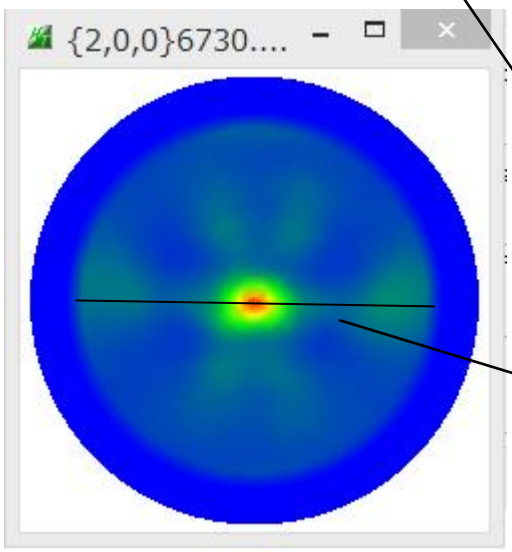


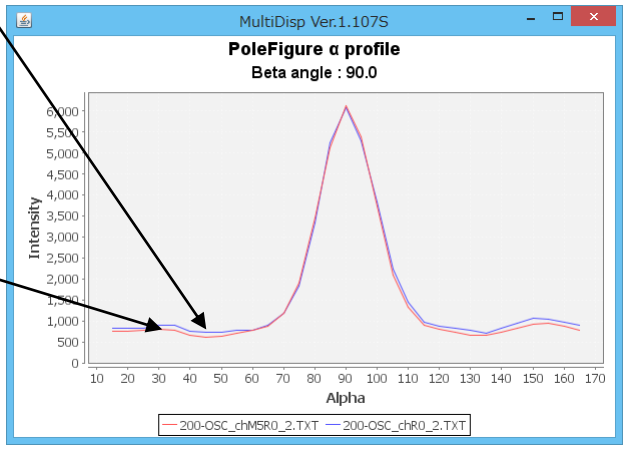
実際に測定したデータ１



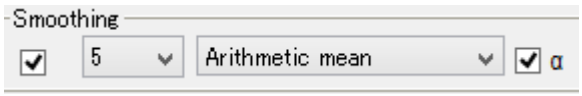


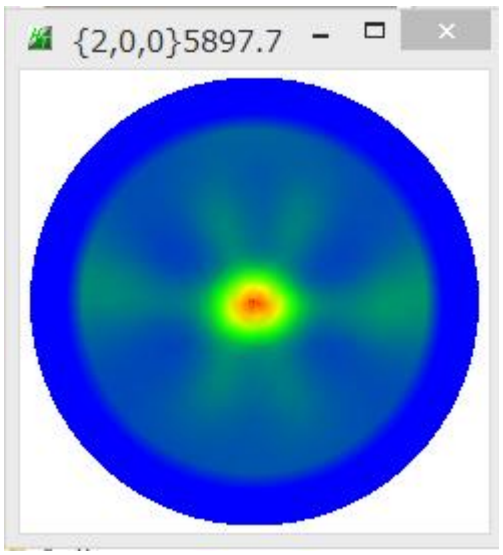


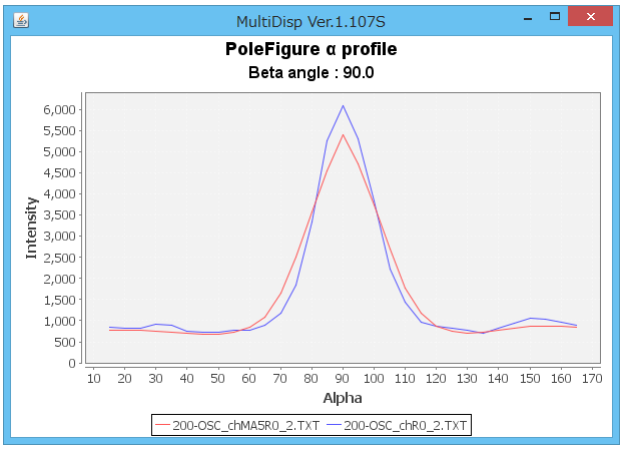




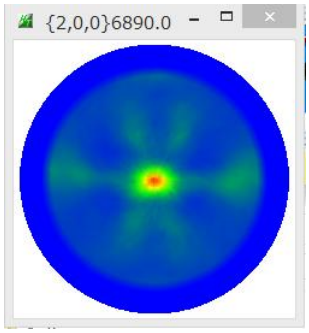
青が平滑化前　　赤が平滑化後

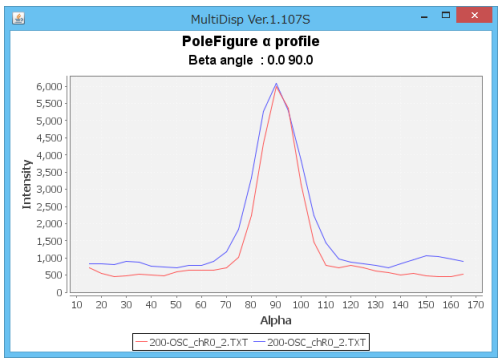


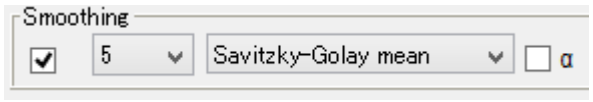


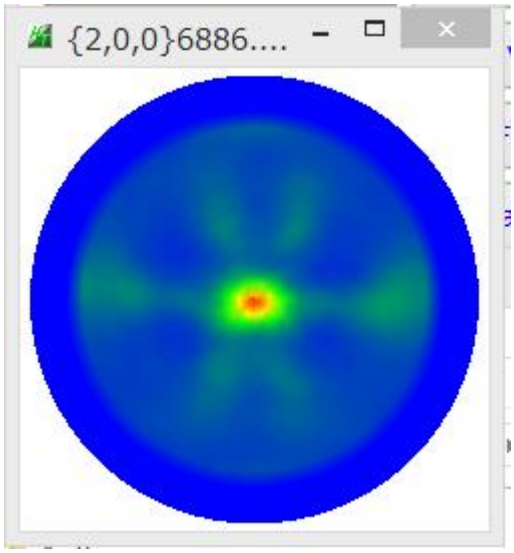


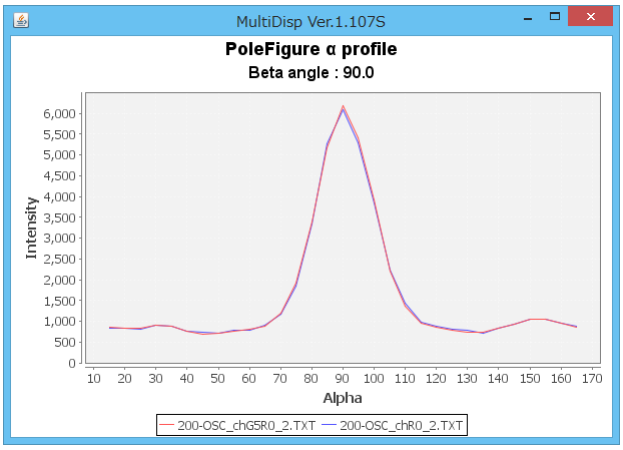
実際に測定したデータ 1



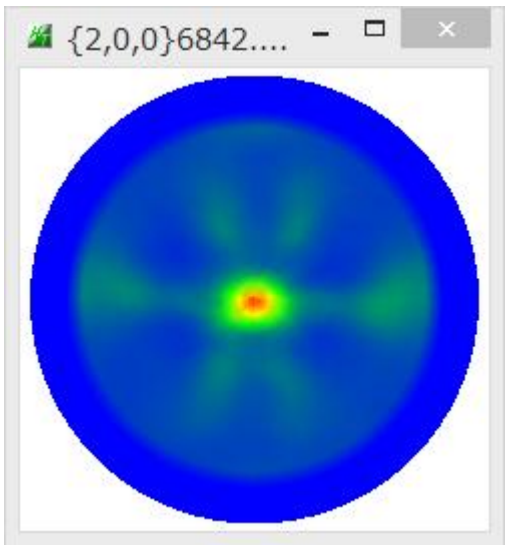


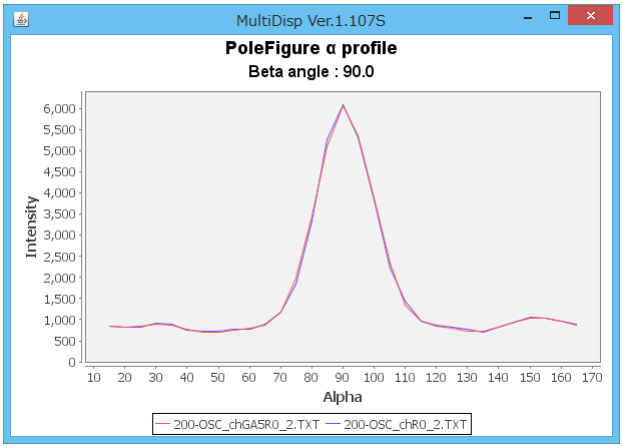




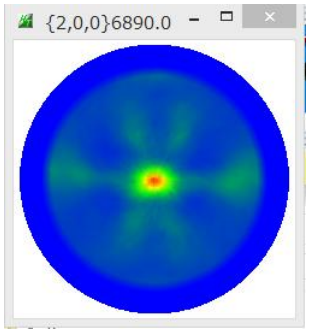


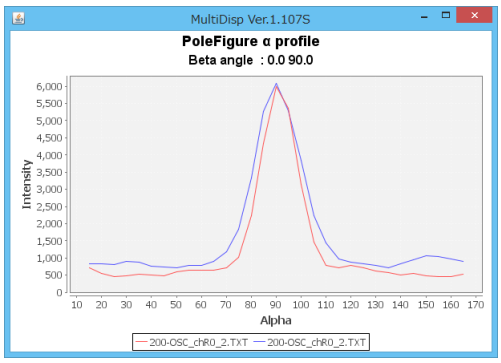
青が平滑化前　　赤が平滑化後

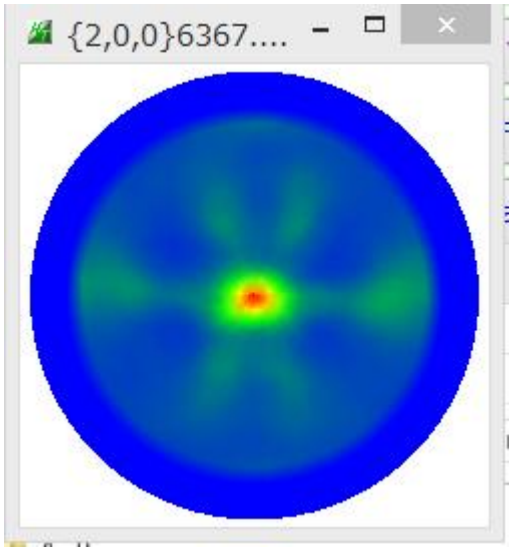


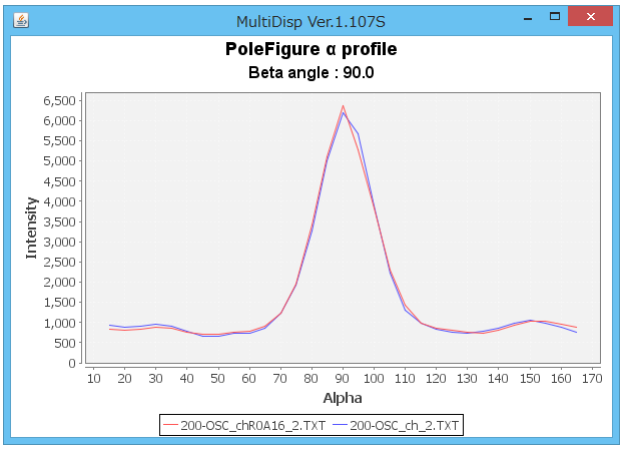


実際に測定したデータ１

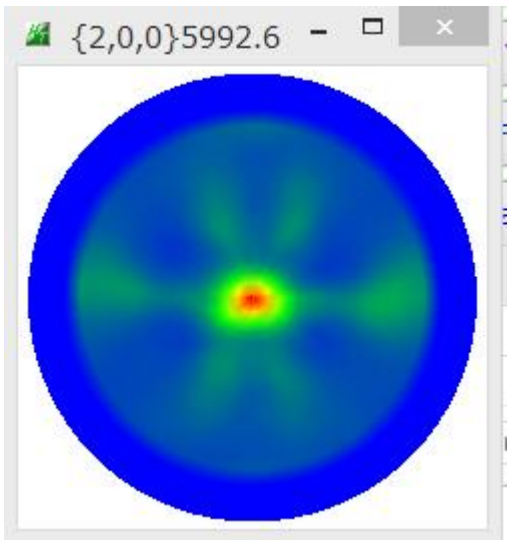


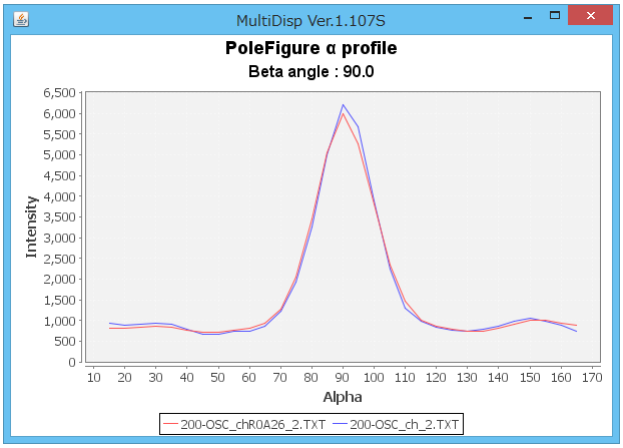




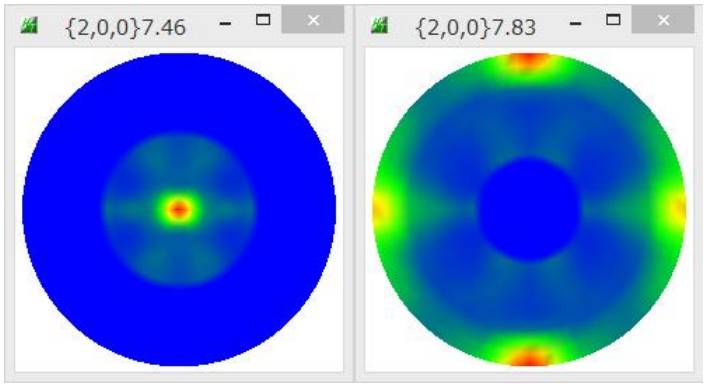


青が平滑化前　　赤が平滑化後

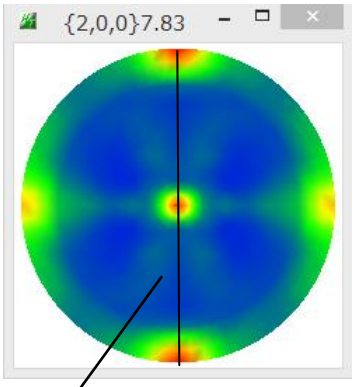


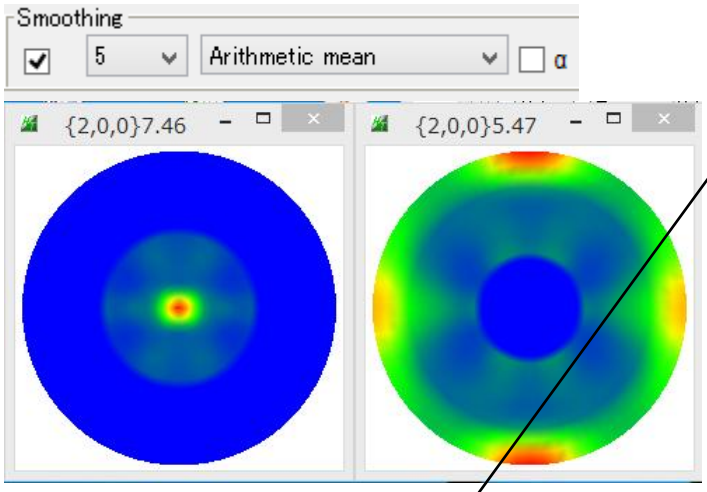


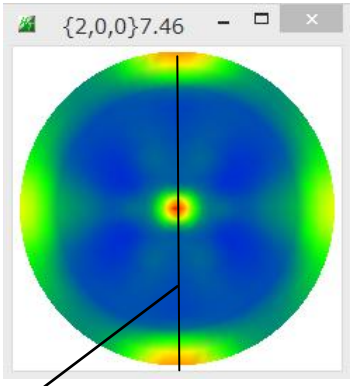
測定した様なデータ



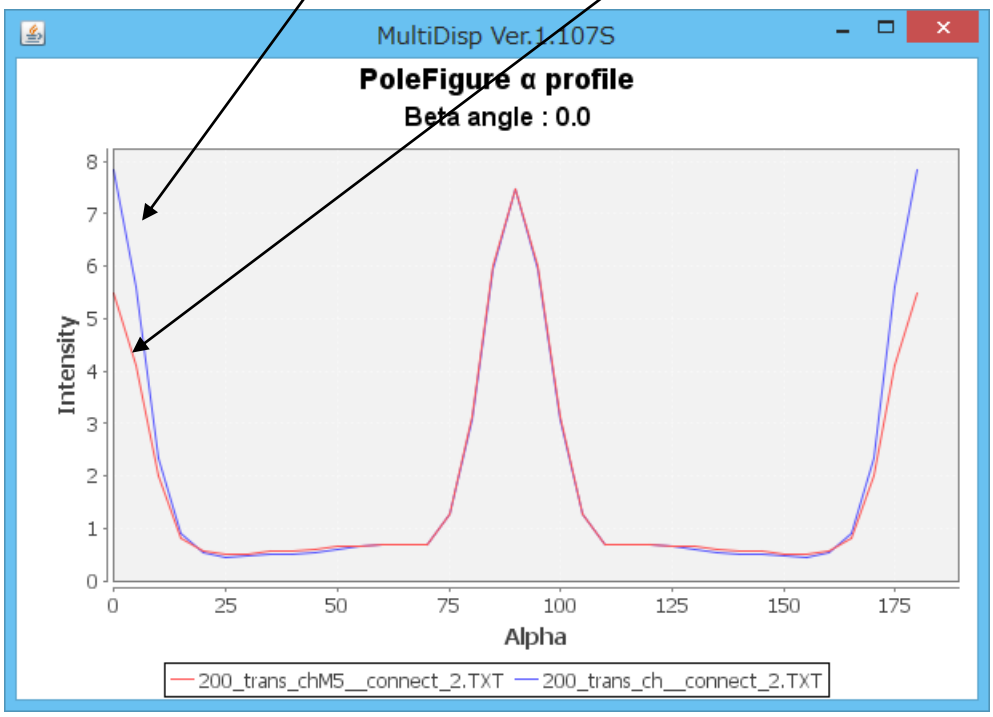
Connection





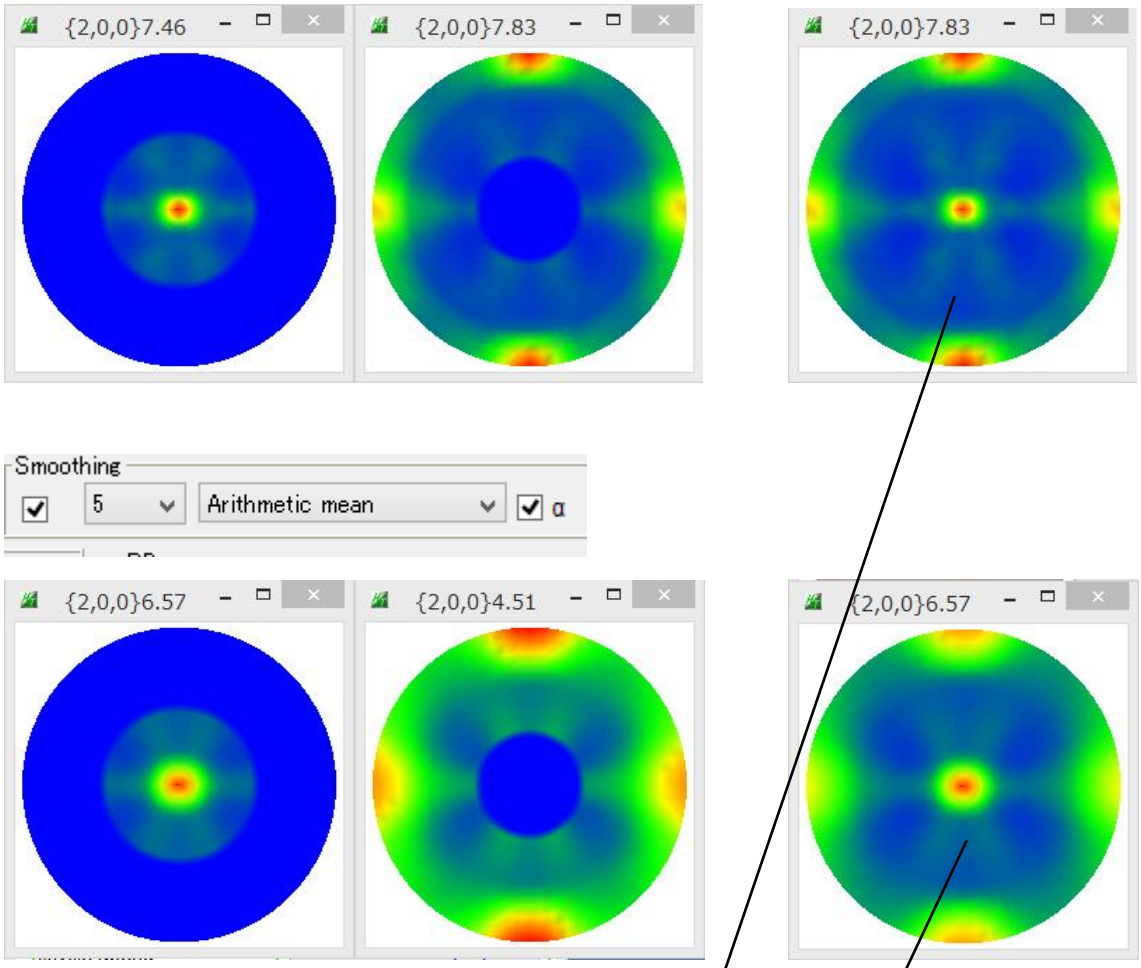


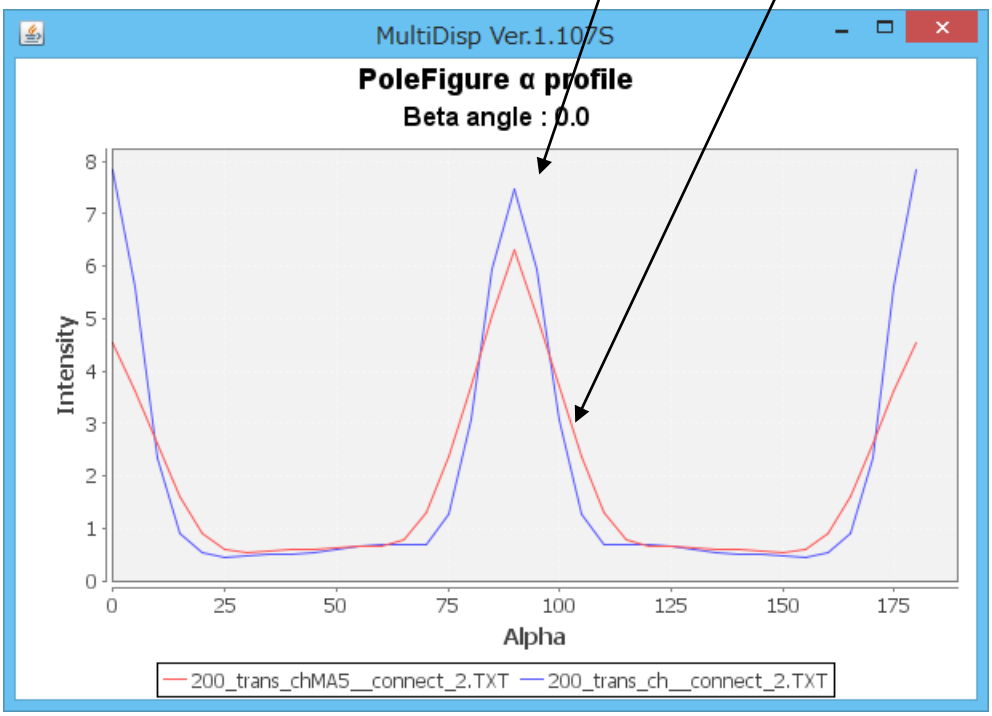
接続後のデータを表示



平滑化で、α＝９０が強調されている

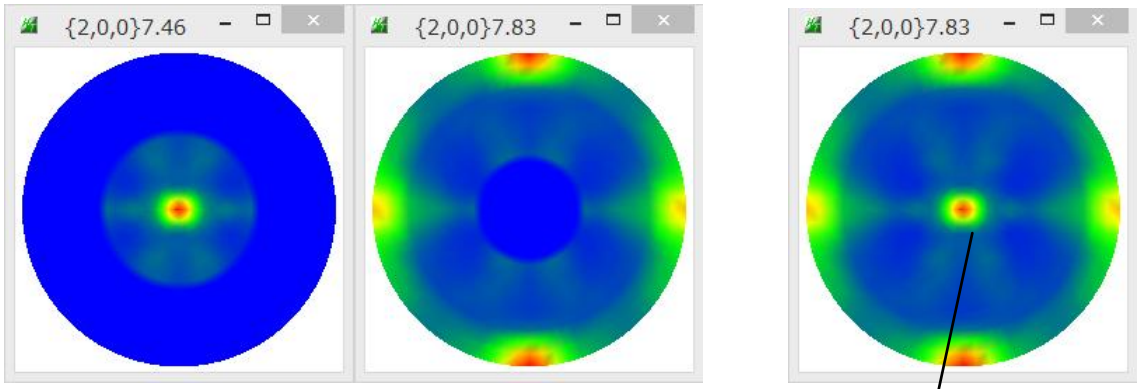
測定した様なデータ

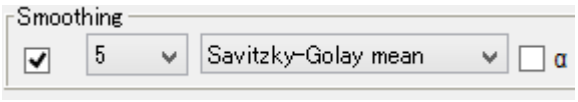


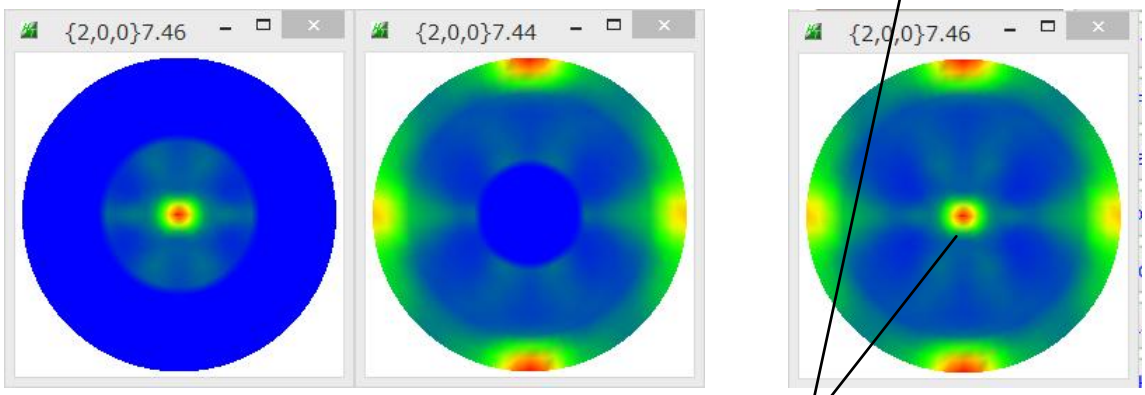


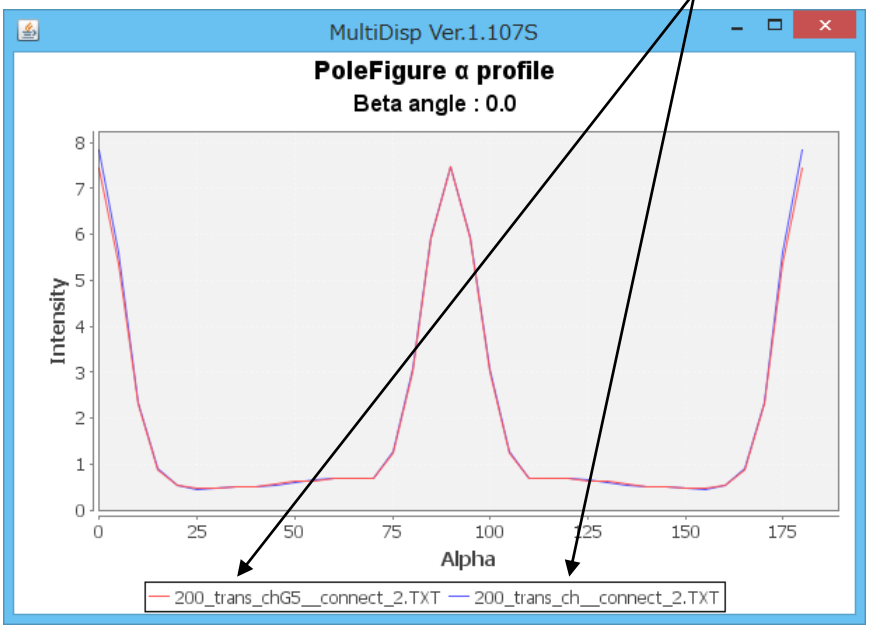
平滑化で、α＝９０が強調されている

測定した様なデータ



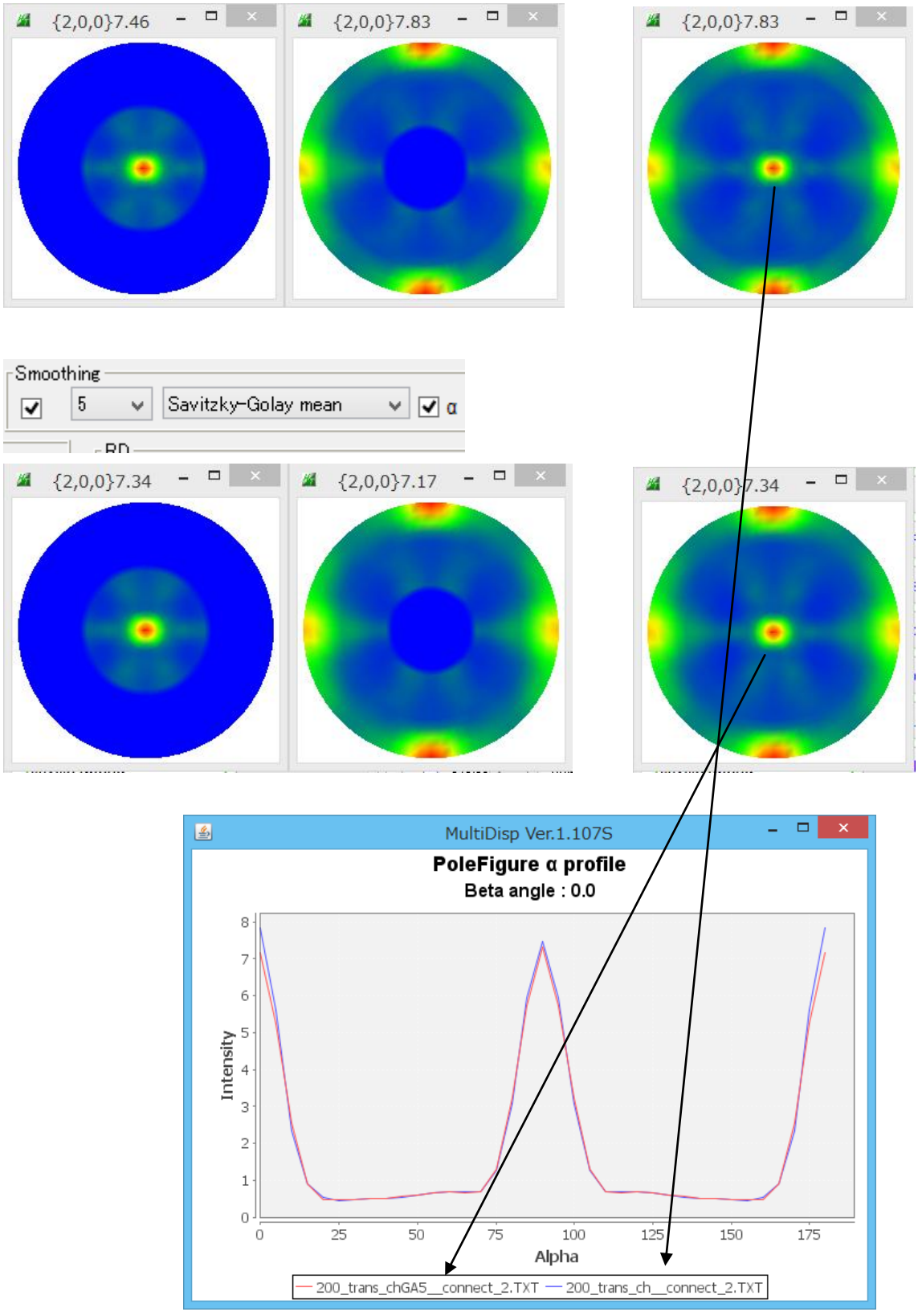






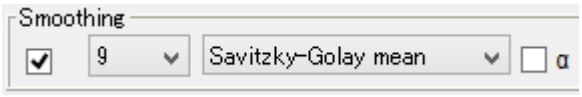
平滑化が少ない

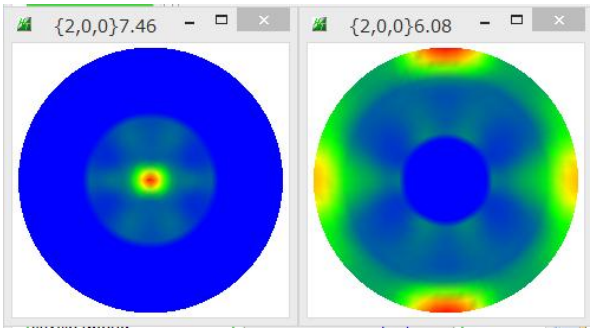
測定した様なデータ

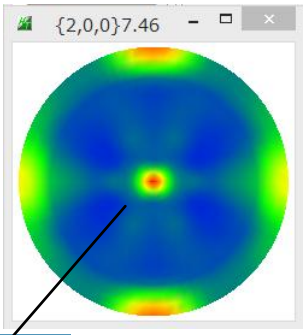


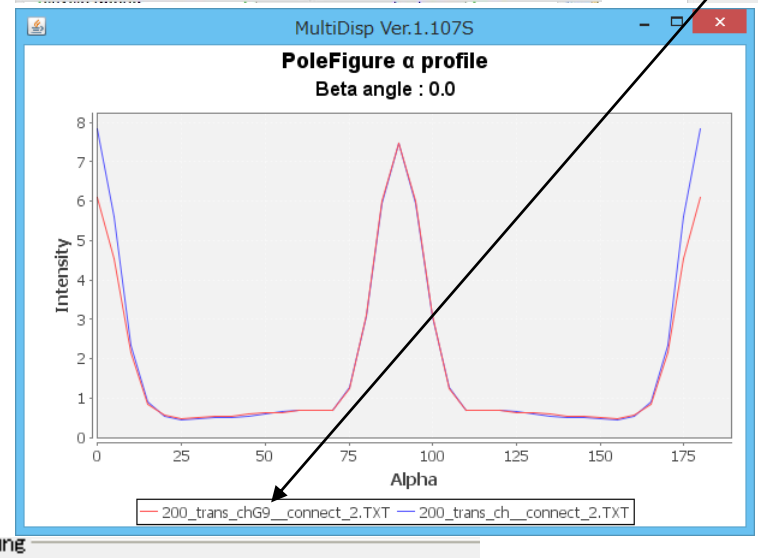
平滑化点数を増やしてみると

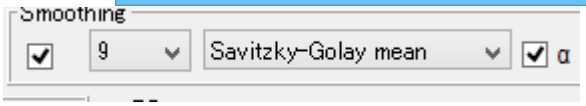
Ｓａｖｉｔｚｋｙ－Ｇｏｌａｙ法のデータ点数を５－＞９に変更

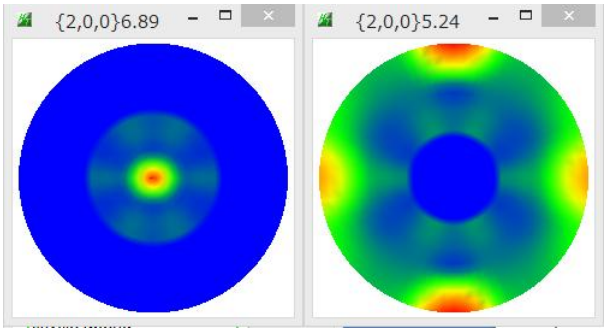


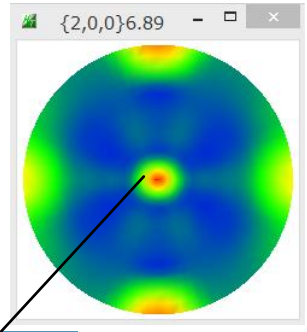


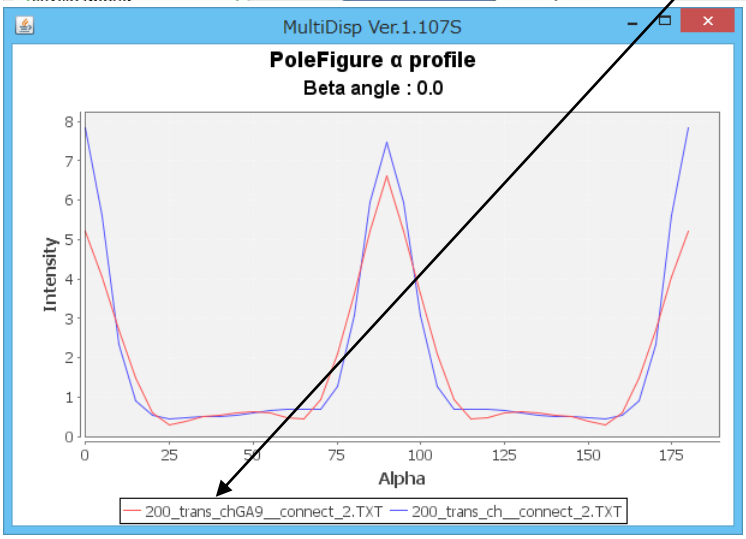






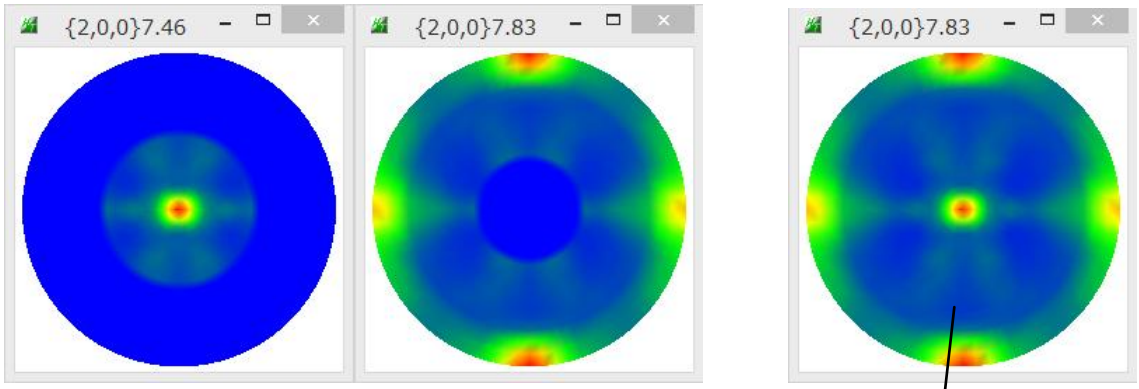




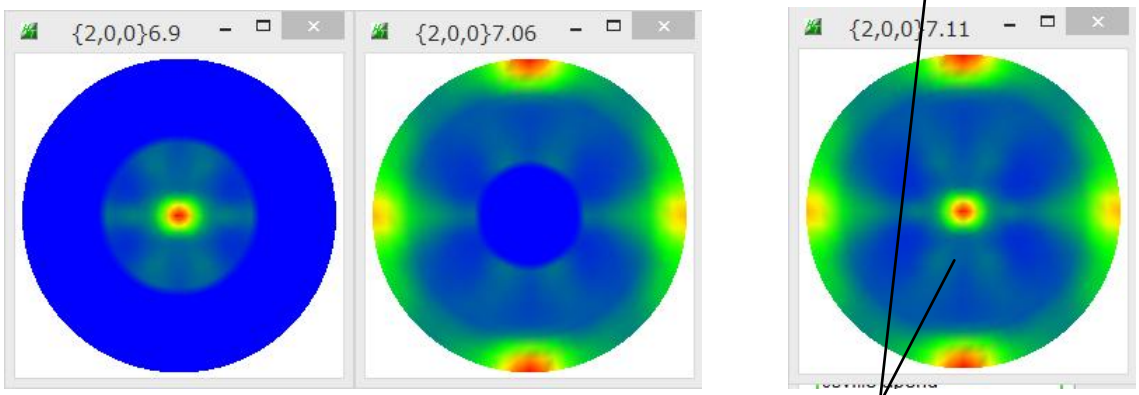


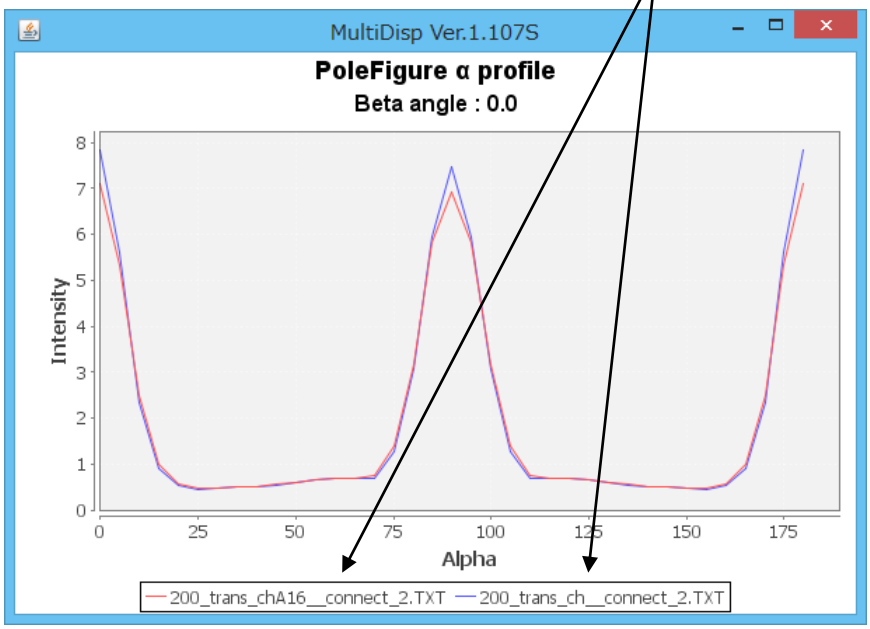
極点図の中心が強調される

測定した様なデータ

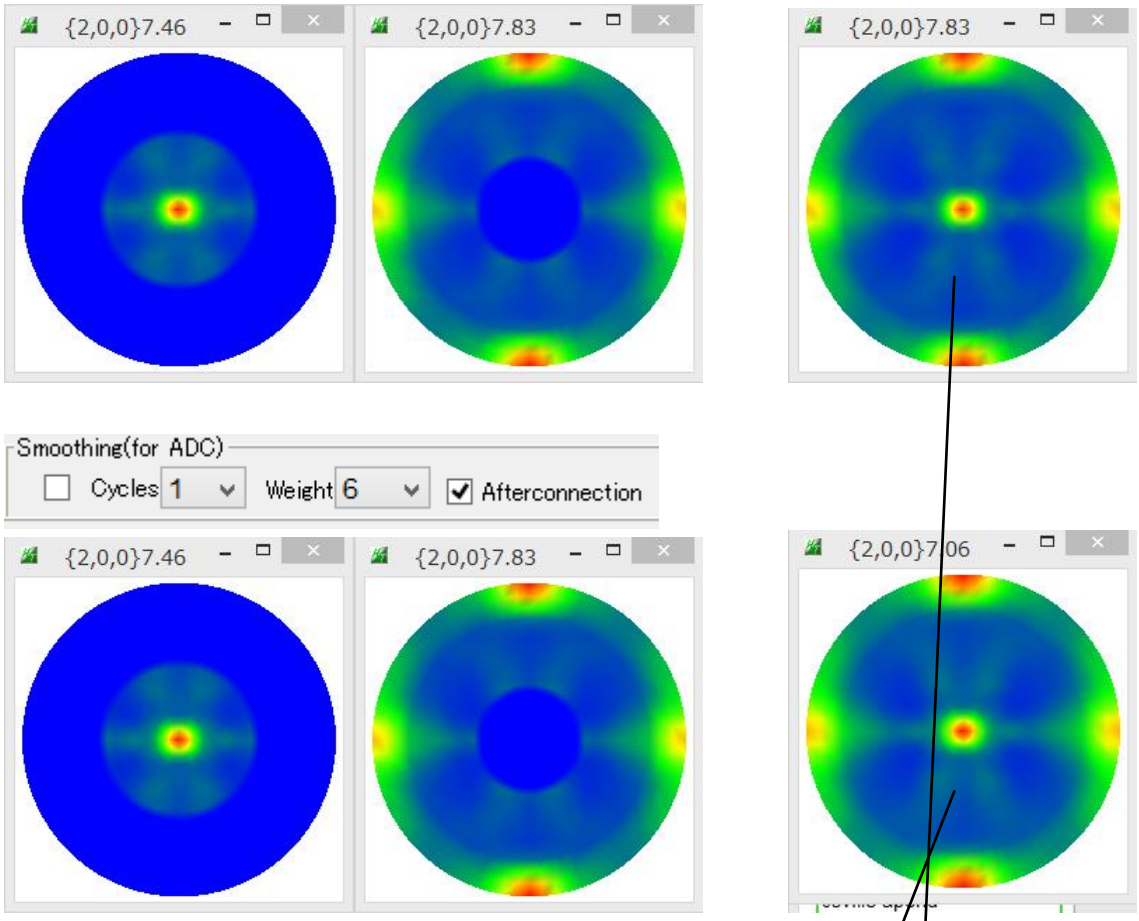

{2,0,0}7.46
{2,0,0}7.83
{2,0,0}7.83

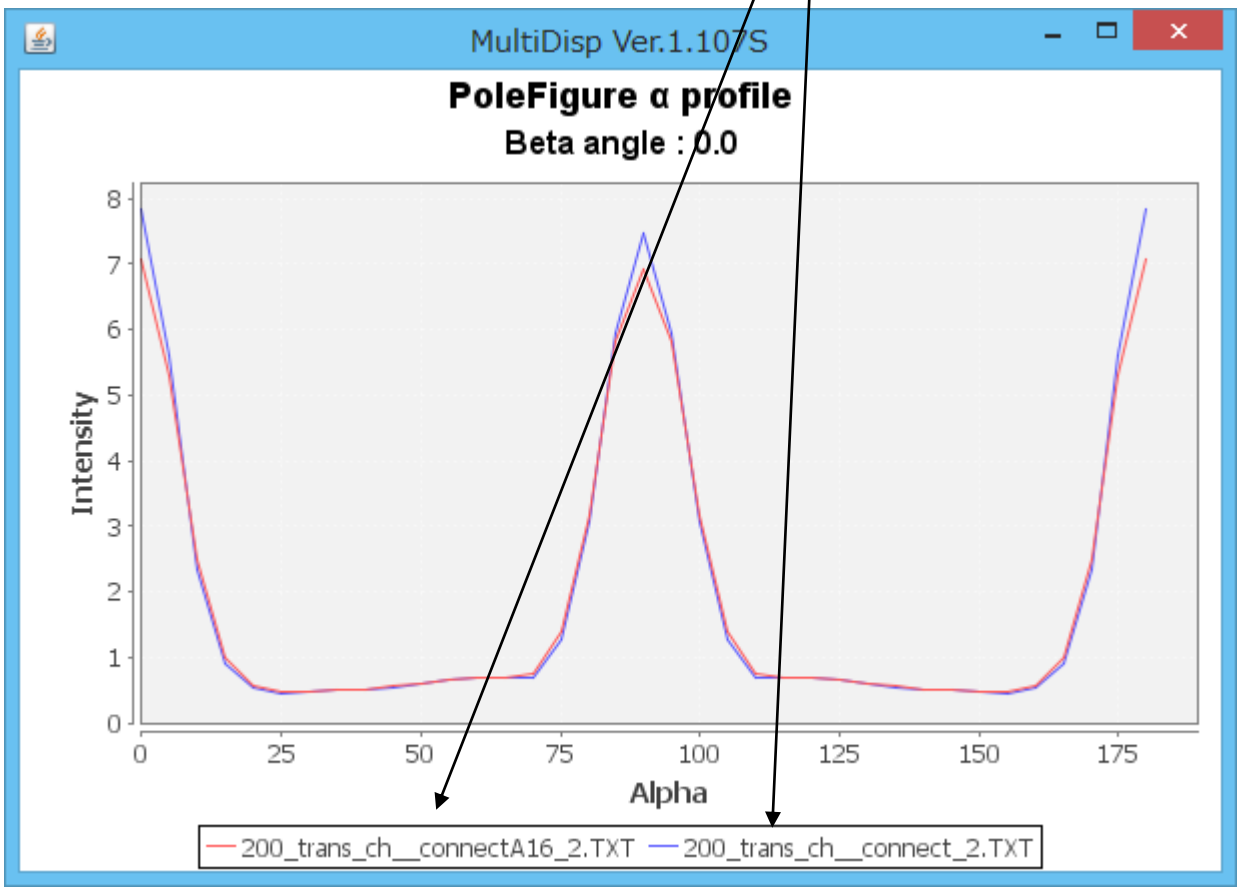

Smoothing(for ADC)
Cycles 1
Weight 6
Afterconnection


{2,0,0}6.9
{2,0,0}7.06
{2,0,0}7.11

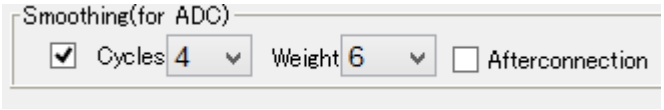

MultiDisp Ver.1.107S
PoleFigure α profile
Beta angle : 0.0
Intensity
Alpha
200_trans_chA16__connect_2.TXT
200_trans_ch__connect_2.TXT

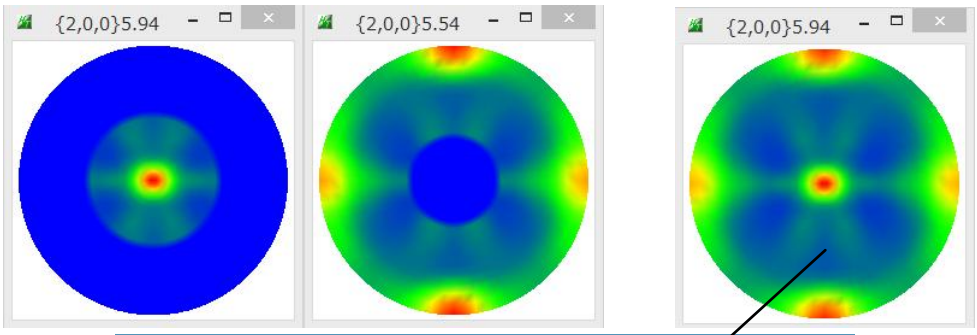
測定した様なデータ

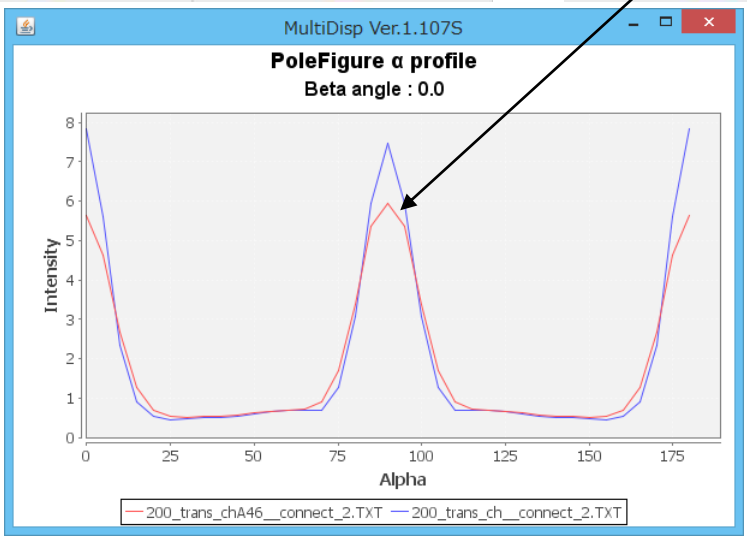


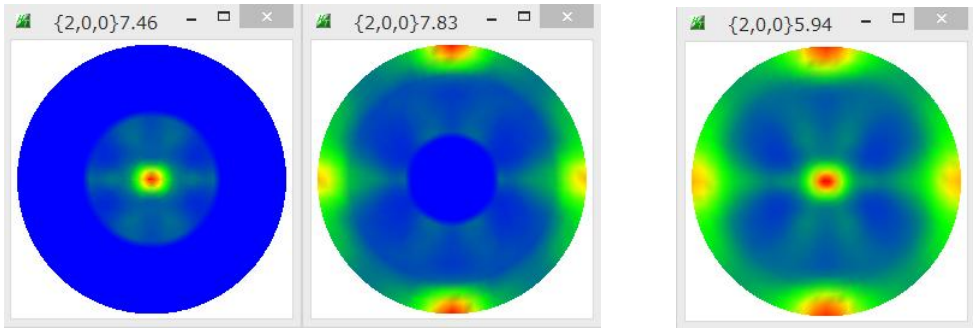


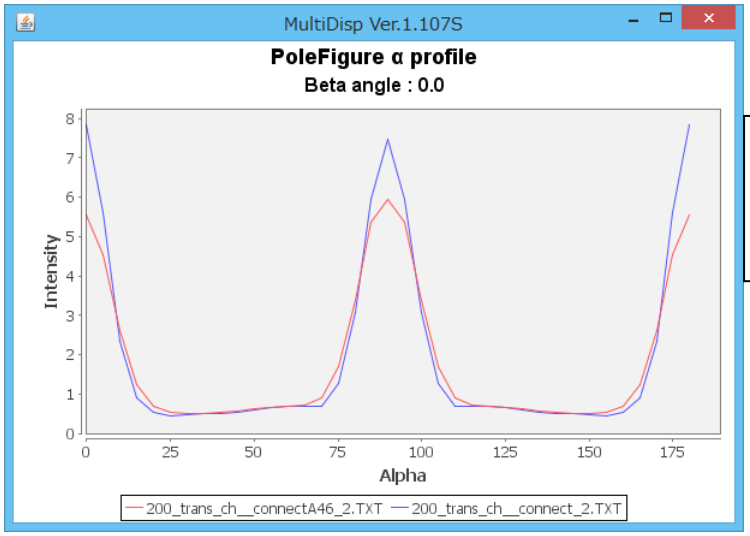
平滑化を強くしてみる





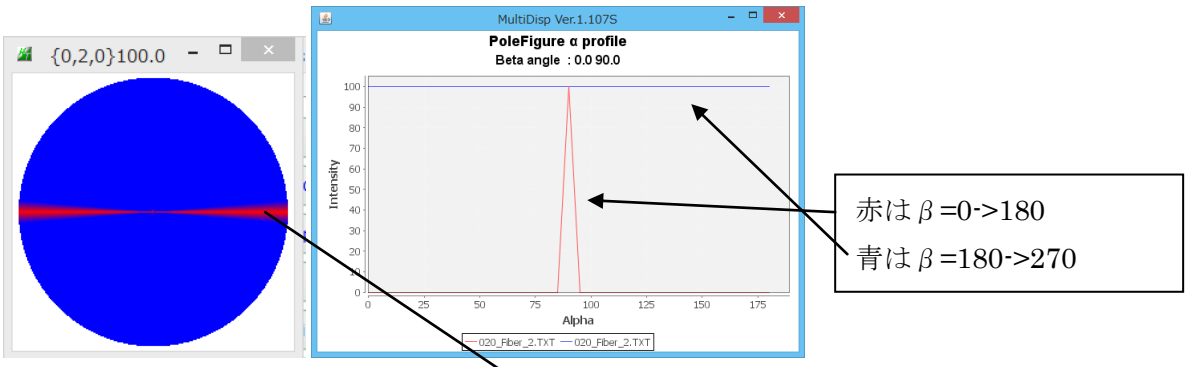




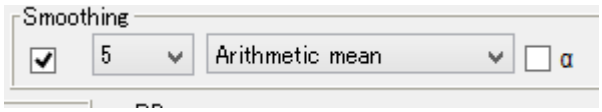


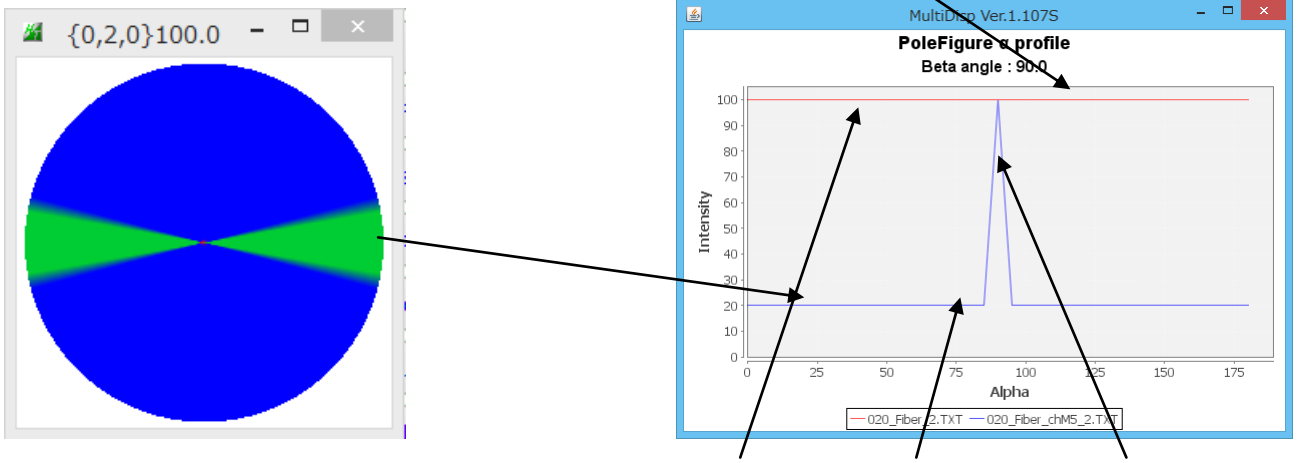
この手法では、極点図の中心の強調が改善される

特殊データで確認１

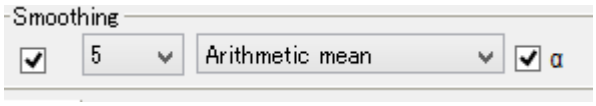


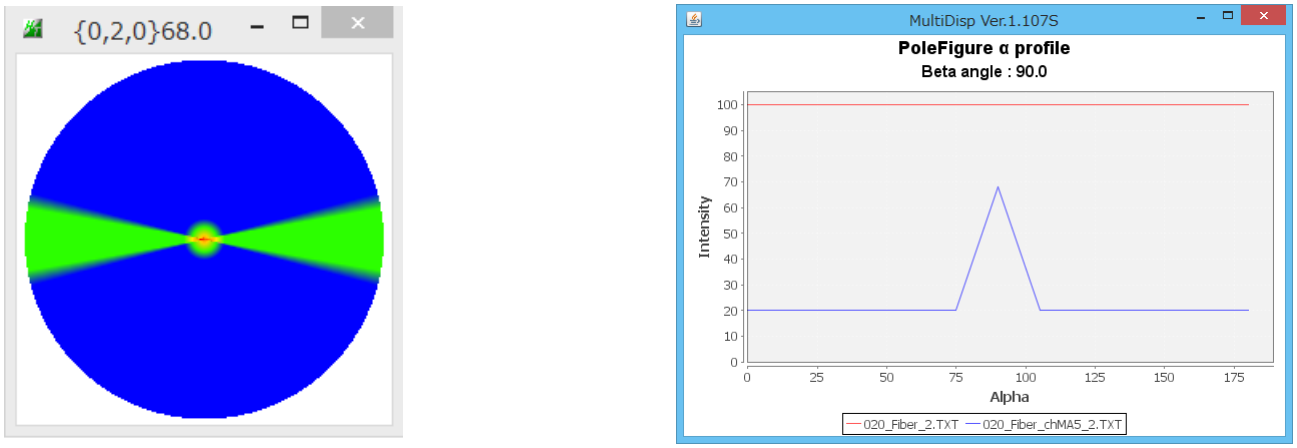
β＝９０と２７０のデータ密度１００、α＝９０は全て１００



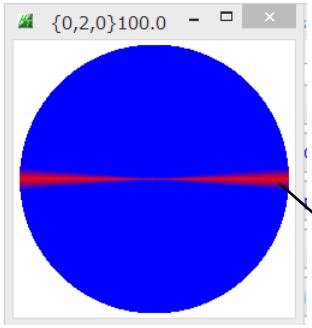


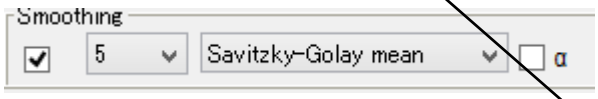
α=90 の β＝90、270 以外を 0 とすると、このピークは消える

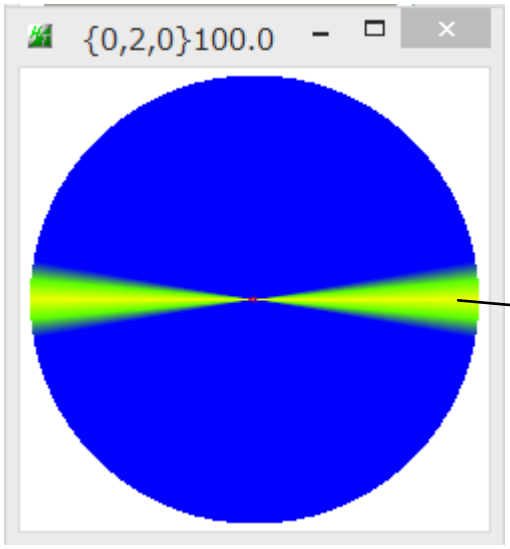


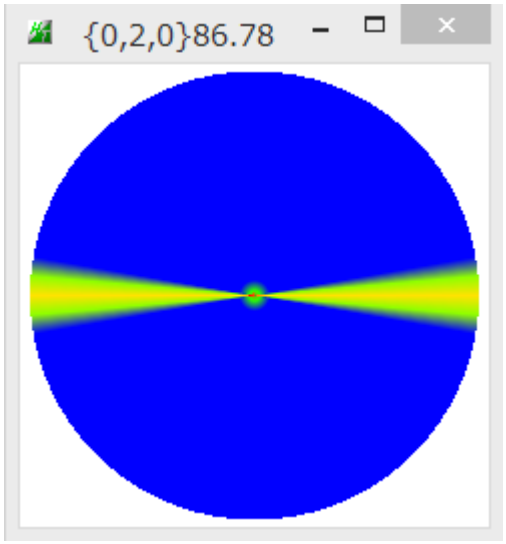


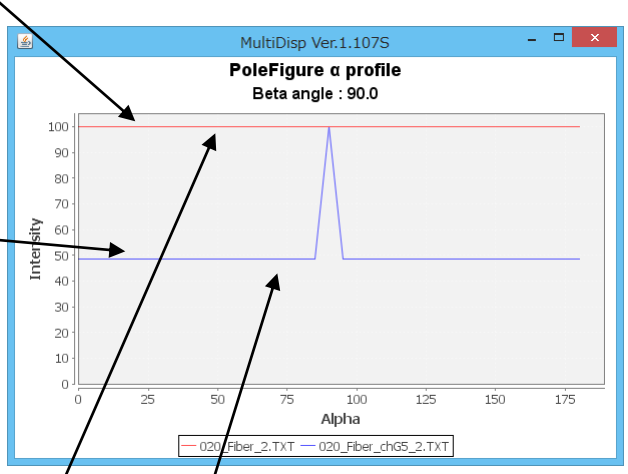
特殊データで確認１



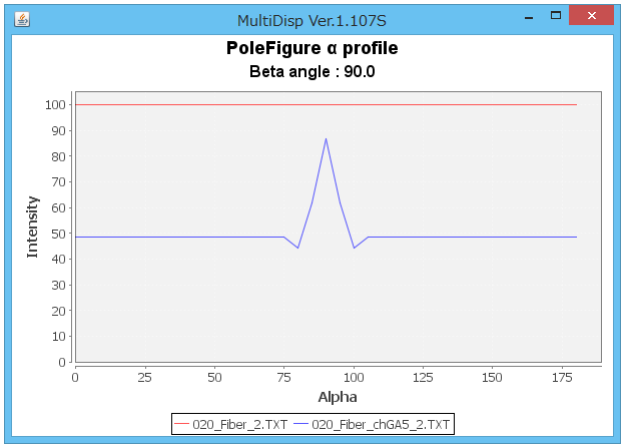




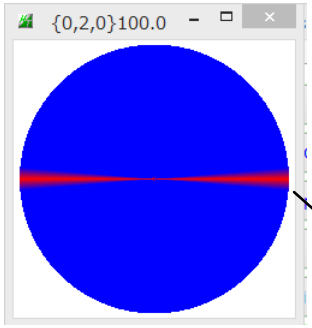


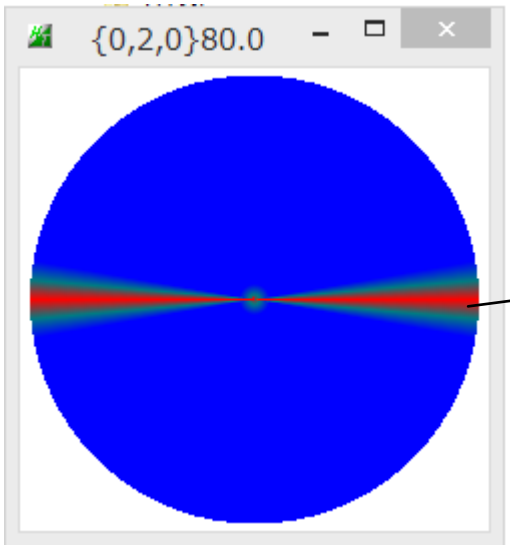


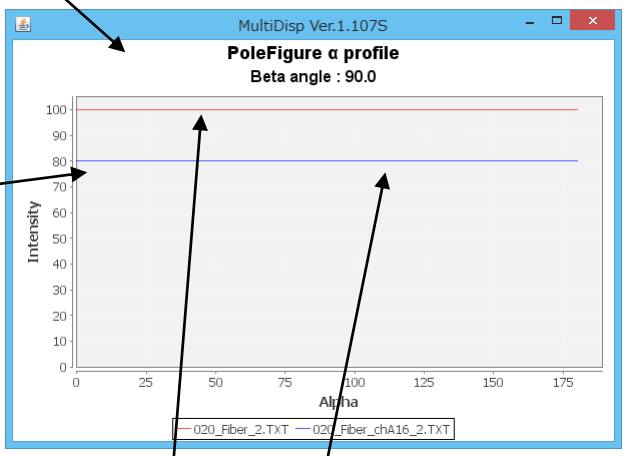
平滑化前　　平滑化後



特殊データで確認１

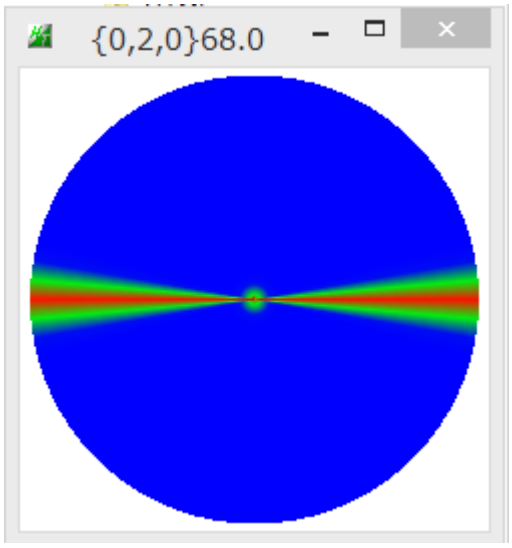


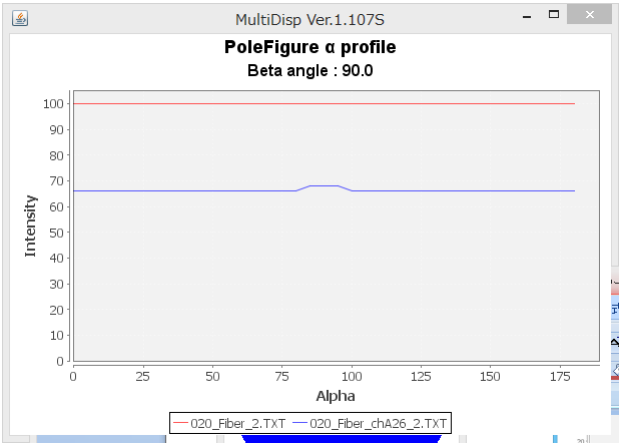




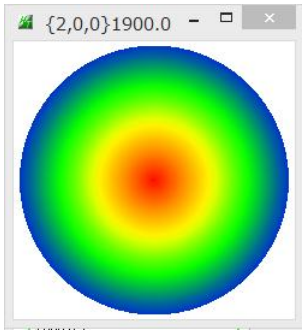
平滑化前　平滑化後

入力極点図が完全極点図のため、Ｃｏｎｎｅｃｔ操作はありません。





特殊データで確認２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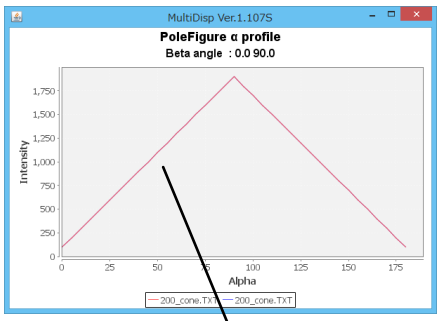
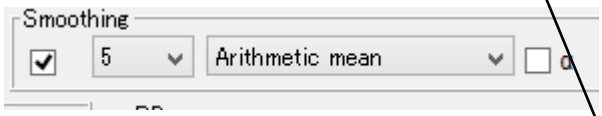
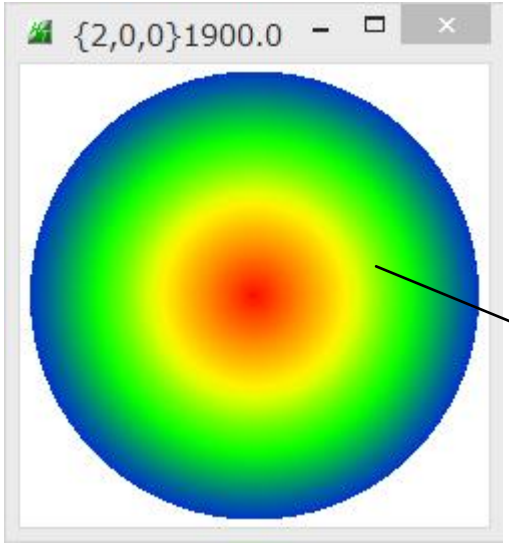
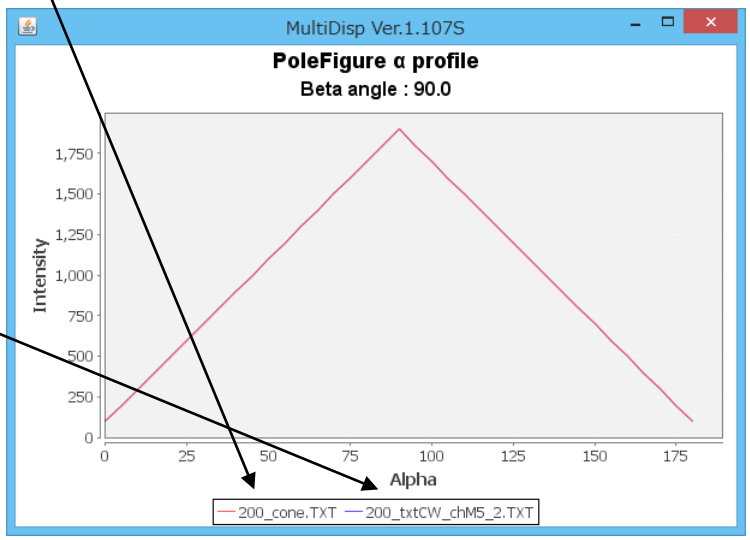
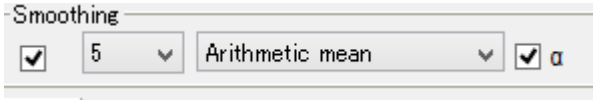
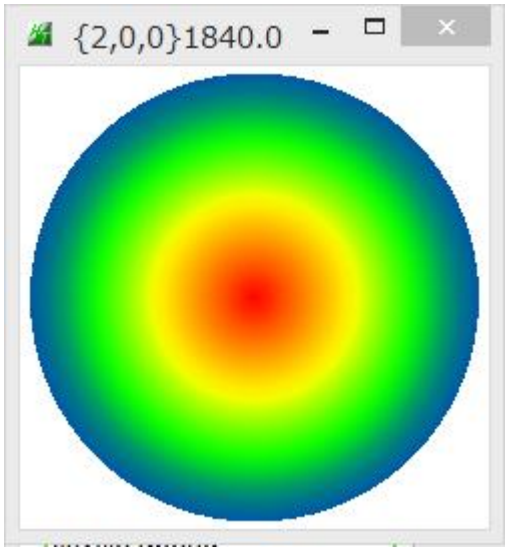

MultiDisp Ver.1.107S
PoleFigure α profile
Beta angle : 0.0 90.0
Intensity
Alpha
200_cone.TXT
200_cone.TXT


Smoothing
5
Arithmetic mean
α


{2,0,0}1900.0


MultiDisp Ver.1.107S
PoleFigure α profile
Beta angle : 90.0
Intensity
Alpha
200_cone.TXT
200_txtCW_chM5_2.TXT


Smoothing
5
Arithmetic mean
α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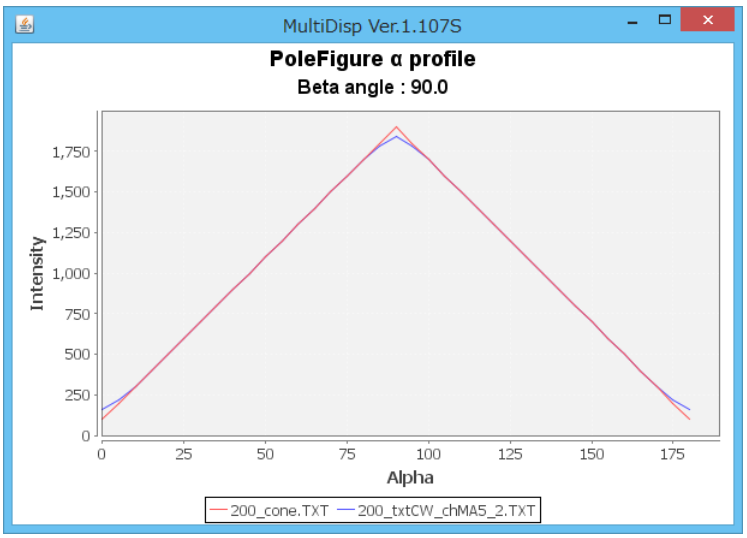
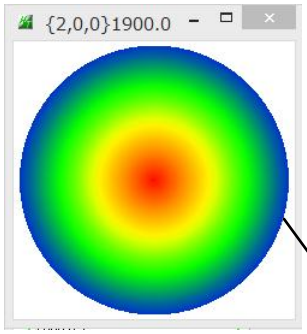
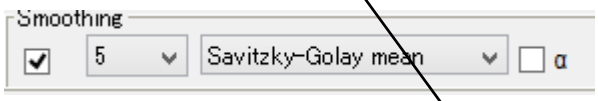
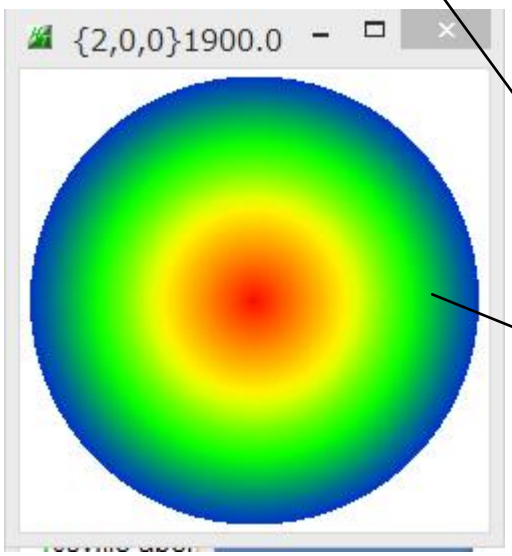

MultiDisp Ver.1.107S
PoleFigure α profile
Beta angle : 90.0
Intensity
Alpha
200_cone.TXT
200_txtCW_chMA5_2.TXT

特殊データで確認２


{2,0,0}1900.0


Smoothing
5
Savitzky-Golay mean
α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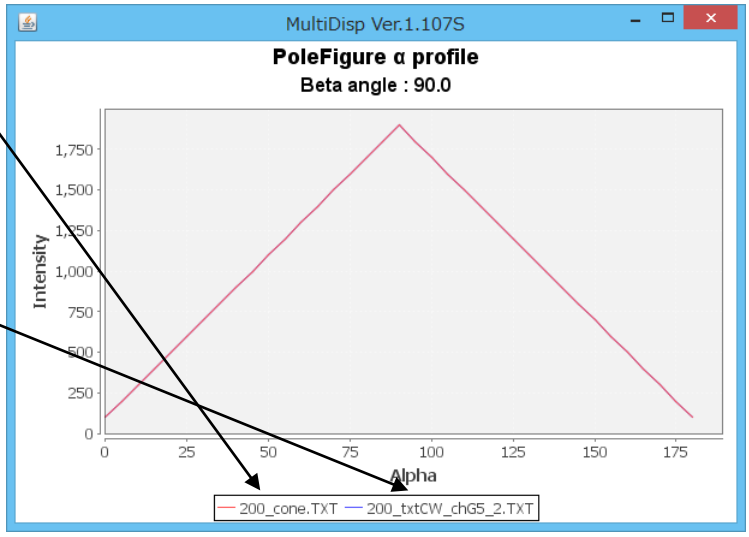
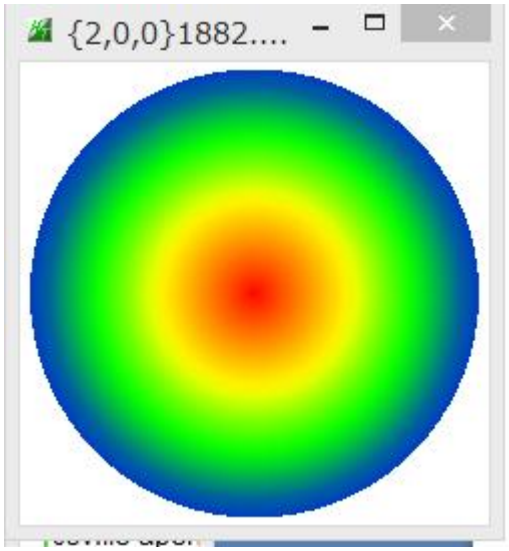
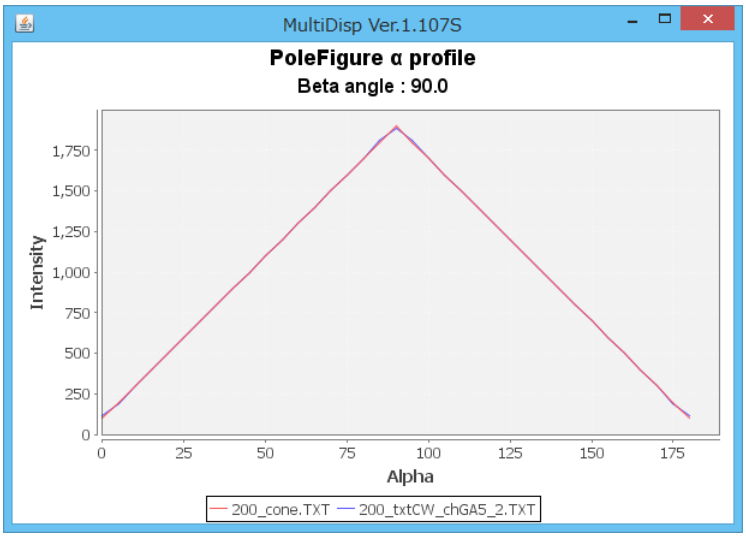
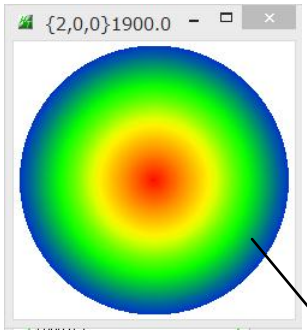

MultiDisp Ver.1.107S
PoleFigure α profile
Beta angle : 90.0
Intensity
1,750
1,500
1,250
1,000
750
500
250
0
0
25
50
75
100
125
150
175
Alpha
200_cone.TXT
200_txtCW_chG5_2.TXT

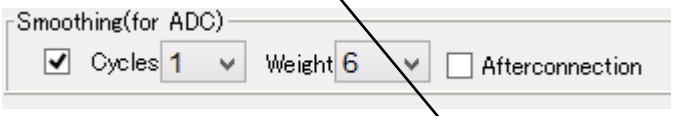

Smoothing
5
Savitzky-Golay mean
α

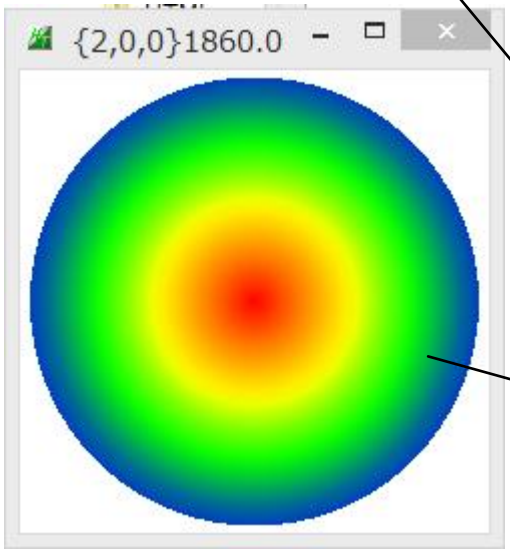

{2,0,0}1882....

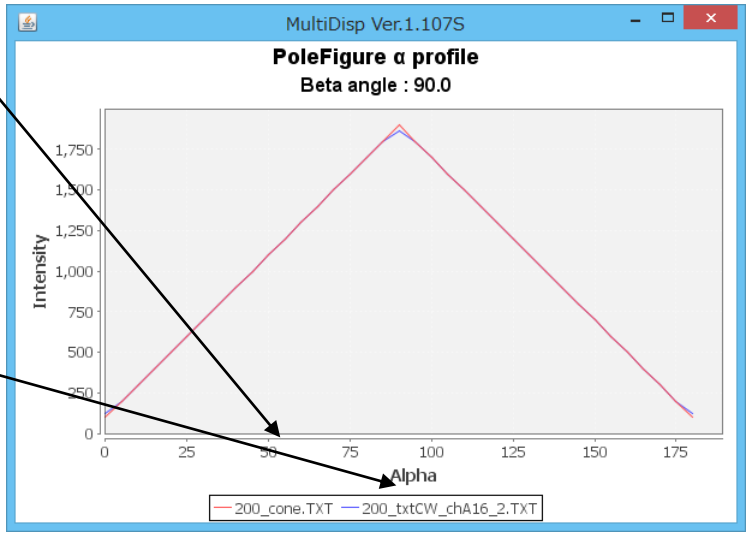

MultiDisp Ver.1.107S
PoleFigure α profile
Beta angle : 90.0
Intensity
1,750
1,500
1,250
1,000
750
500
250
0
0
25
50
75
100
125
150
175
Alpha
200_cone.TXT
200_txtCW_chGA5_2.TXT

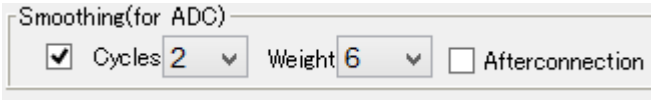
特殊データで確認２

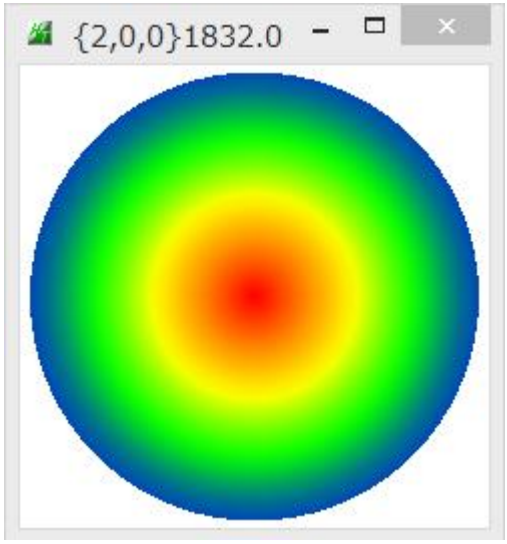

{2,0,0}1900.0

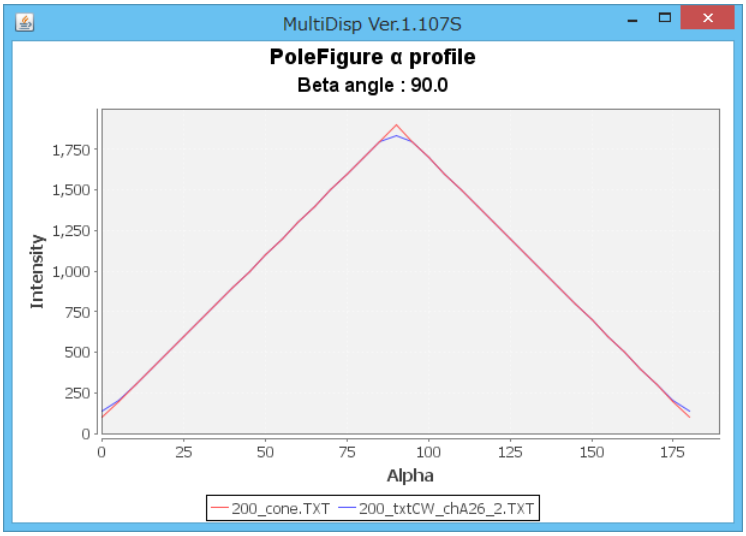

Smoothing(for ADC)
Cycles 1
Weight 6
Afterconnection


{2,0,0}1860.0

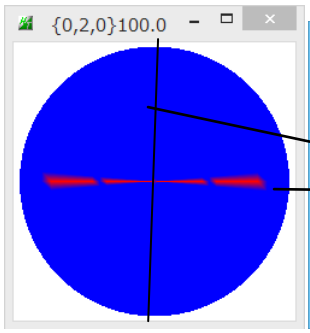

MultiDisp Ver.1.107S
PoleFigure α profile
Beta angle : 90.0
Intensity
1,750
1,500
1,250
1,000
750
500
250
0
0
25
50
75
100
125
150
175
Alpha
200_cone.TXT
200_txtCW_chA16_2.TXT

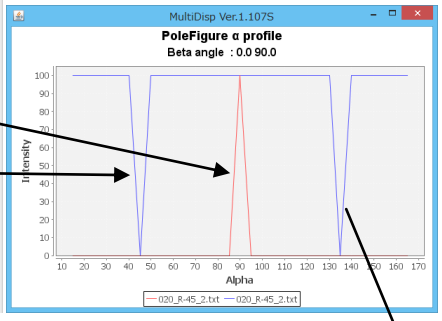

Smoothing(for ADC)
Cycles 2
Weight 6
Afterconnection


{2,0,0}1832.0

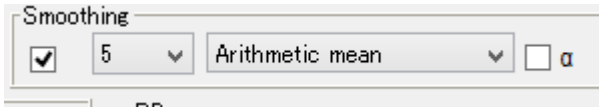

MultiDisp Ver.1.107S
PoleFigure α profile
Beta angle : 90.0
Intensity
1,750
1,500
1,250
1,000
750
500
250
0
0
25
50
75
100
125
150
175
Alpha
200_cone.TXT
200_txtCW_chA26_2.TXT

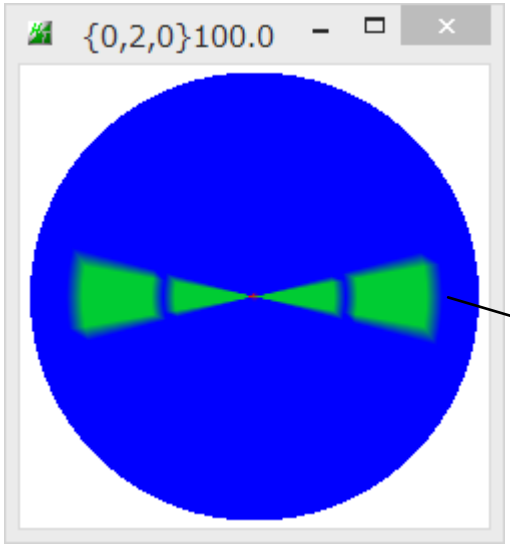
特殊データで確認３

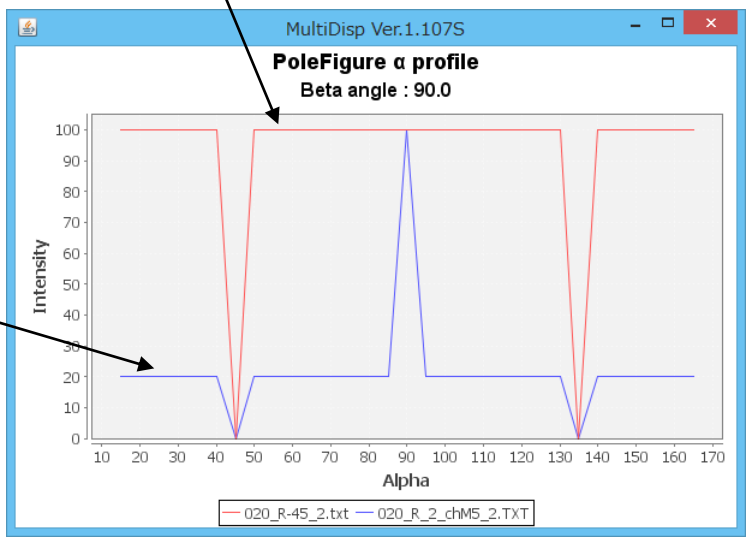


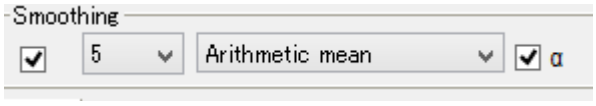


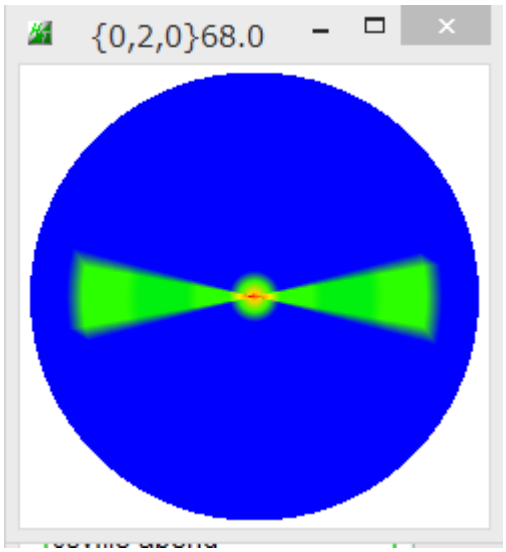
β=90->270 の密度が 100、α=90 の全て 100
α=45 の全てのデータを 0

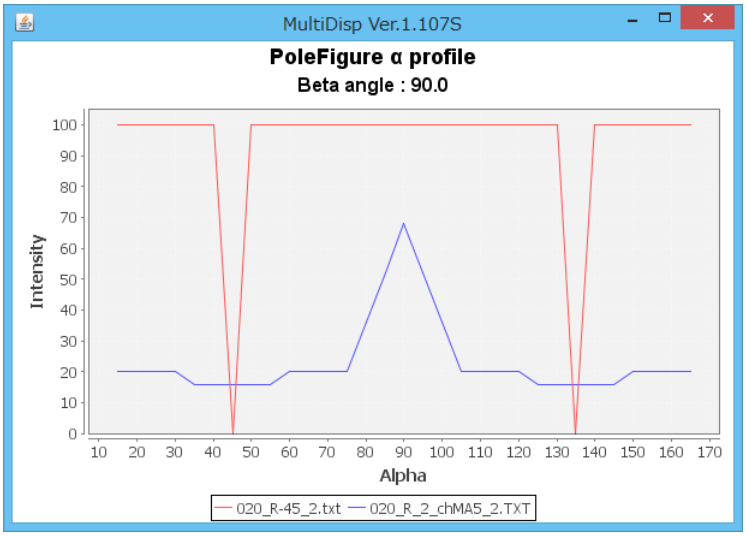




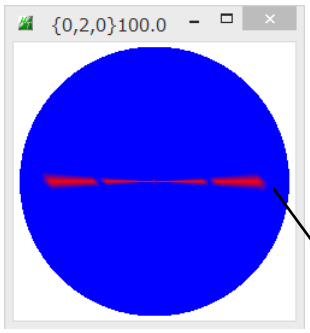


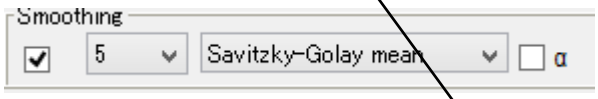


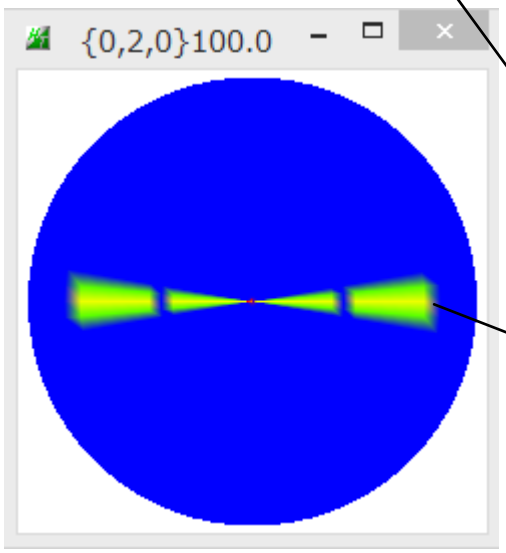


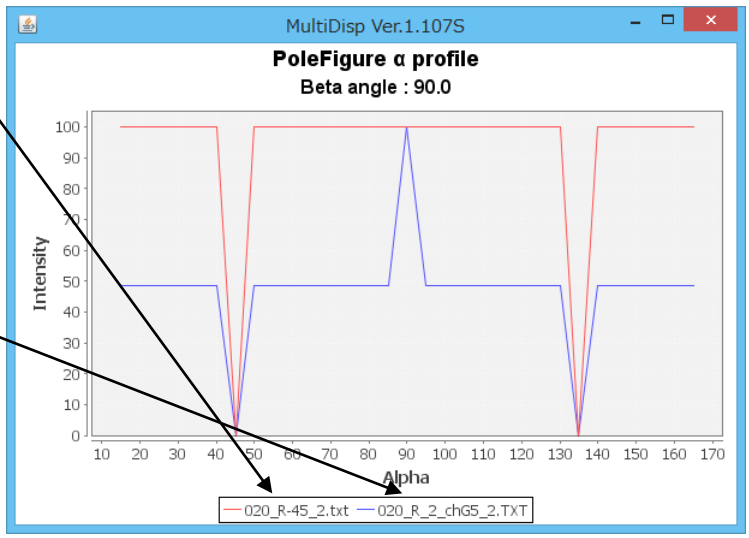


特殊データで確認３

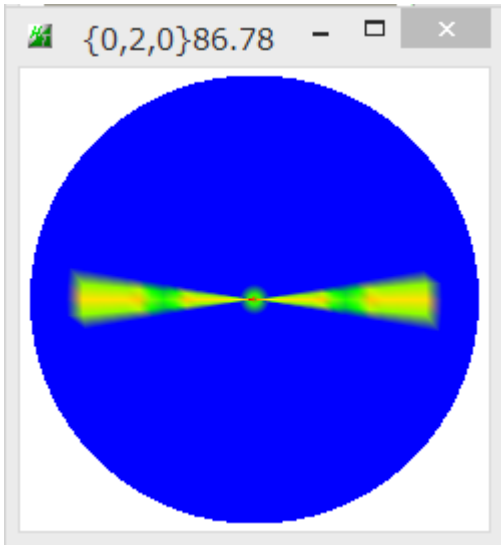

{0,2,0}100.0

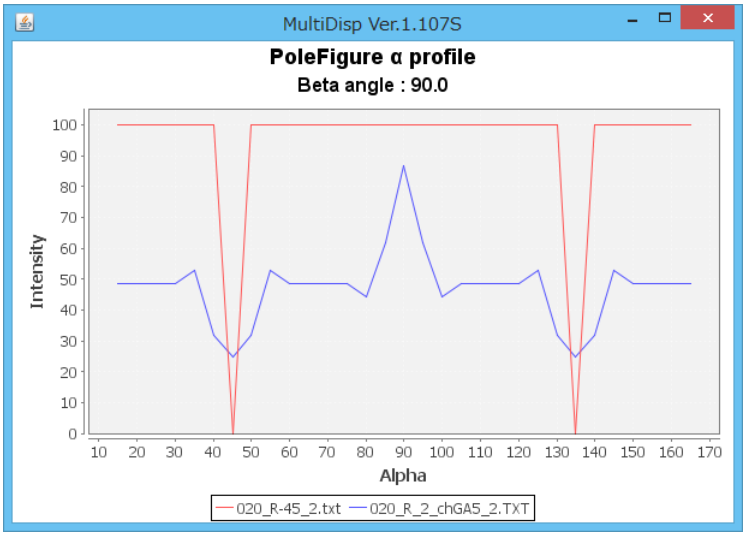

Smoothing
5
Savitzky-Golay mean
α


{0,2,0}100.0

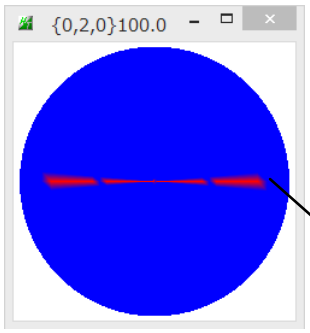

MultiDisp Ver.1.107S
PoleFigure α profile
Beta angle : 90.0
Intensity
Alpha
020_R-45_2.txt
020_R_2_chG5_2.TXT


Smoothing
5
Savitzky-Golay mean
α

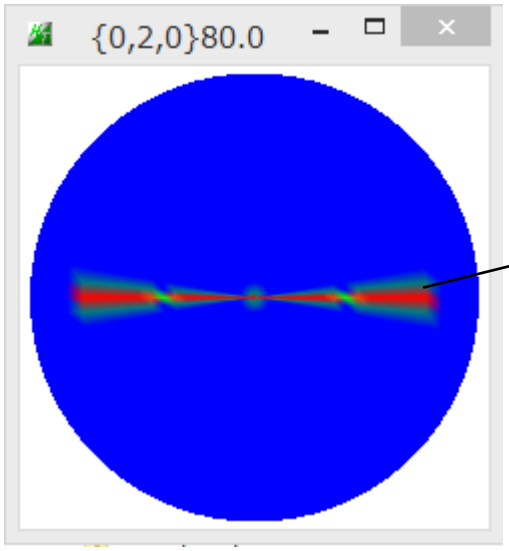

{0,2,0}86.78


MultiDisp Ver.1.107S
PoleFigure α profile
Beta angle : 90.0
Intensity
Alpha
020_R-45_2.txt
020_R_2_chGA5_2.TXT

特殊データで確認３


{0,2,0}100.0


Smoothing(for ADC)
Cycles 1
Weight 6
Afterconnection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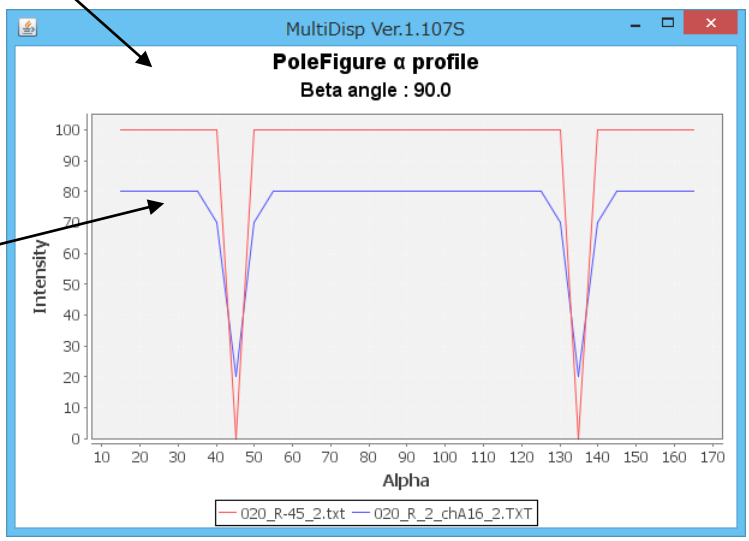
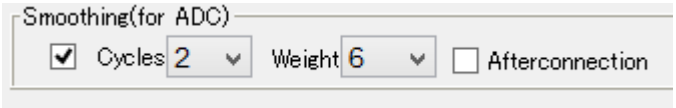
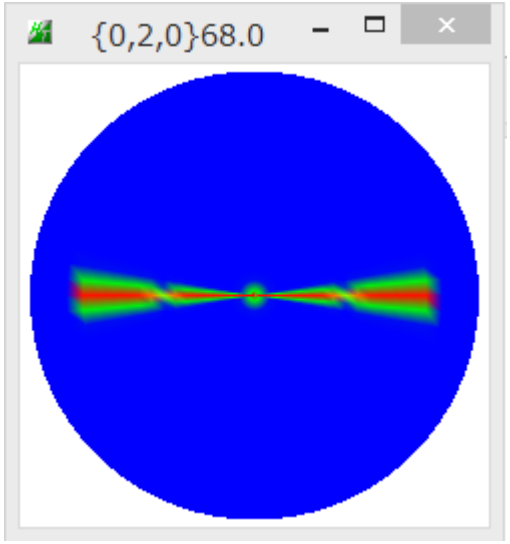
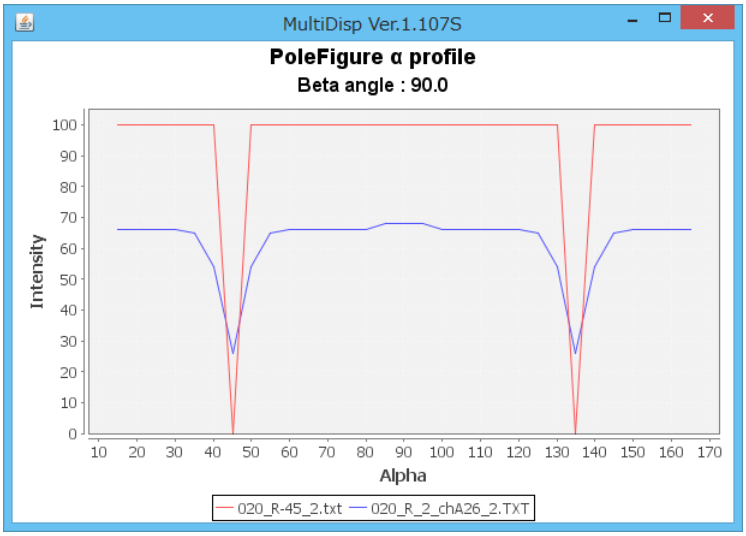

MultiDisp Ver.1.107S
PoleFigure α profile
Beta angle : 90.0
Intensity
Alpha
020_R-45_2.txt
020_R_2_chA16_2.TXT


Smoothing(for ADC)
Cycles 2
Weight 6
Afterconnection


{0,2,0}68.0


MultiDisp Ver.1.107S
PoleFigure α profile
Beta angle : 90.0
Intensity
Alpha
020_R-45_2.txt
020_R_2_chA26_2.TXT