

Sampling Analysis

Analysis1

(Q=256)

Image 1:

1. U,V constant =1,1

Y	Output
1	acceptable
2	acceptable
3	unacceptable
4	unacceptable

Image 2:

1. U,V constant =1,1

Y	Output
1	acceptable
2	unacceptable
3	unacceptable
4	unacceptable

2. Y,V constant =1,1

U	Output
1	acceptable
2	acceptable
3	acceptable
4	acceptable
5	acceptable
6	acceptable
7	unacceptable
8	unacceptable

2. Y,V constant =1,1

U	Output
1	acceptable
2	unacceptable
3	unacceptable
4	unacceptable

3. Y,U constant=1,1

V	Output
1	acceptable
2	acceptable
3	acceptable
4	acceptable
5	acceptable
6	acceptable
7	unacceptable
8	unacceptable

3. Y,U constant = 1,1

V	Output
1	acceptable
2	unacceptable
3	unacceptable
4	unacceptable

Image 4:

1. U,V constant =1,1

Y	Output
1	acceptable
2	acceptable
3	acceptable
4	unacceptable

2. Y,V constant =1,1

U	Output
1	acceptable
2	acceptable
3	acceptable
4	acceptable
5	acceptable
6	acceptable
7	unacceptable

3. Y,U constant=1,1

V	Output
1	acceptable
2	acceptable
3	acceptable
4	acceptable
5	acceptable
6	acceptable
7	unacceptable

Image 6:

1. U,V constant =1,1

Y	Output
1	acceptable
2	acceptable
3	acceptable
4	unacceptable

2. Y,V constant =1,1

U	Output
1	acceptable
2	acceptable
3	acceptable
4	acceptable
5	acceptable
6	acceptable
7	unacceptable

3. Y,V constant =1,1

V	Output
1	acceptable
2	acceptable
3	acceptable
4	acceptable
5	acceptable
6	acceptable
7	acceptable
8	unacceptable

by looking at the trend of sampling in the above four image analysis tables,

- On an average for all images the Y sampling(constant UV) becomes unacceptable for a factor of 2, whereas U(constant YV) subsampling and V(constant YU) subsampling starts distorting after a value of 7.
- The lines and Edges start distorting earlier than the plane areas.
- Aliasing is more in case on images having more color pattern variations.
- Gray scale image doesn't change for U and V channel subsampling keeping Y constant.

We can come to the conclusion that sampling along Y channel introduces distortion earlier than that along U and V channels, and Sampling acceptance differs from one image to another based on the pixel resolution and color properties.

Analysis2

(Q=256)

The quality of the results varies according to the images because of

1. The up-sampling algorithm being used, and
 2. Considering values of all frequencies in the original image while subsampling, irrespective of the up-sampling algorithm.
- Since subsampling was done only along the horizontal plane of the image, we have considered **Linear Interpolation** to up-sample the image, better up-sampling algorithms like bi-linear, cubic and bi-cubic algorithms could be used in case of subsampling along both axes.
 - The graying and distortion of the lines and edges present in the output can be improvised using **a pre-filtering** mechanism before subsampling to consider only required frequencies on the input.
 - We can use a Gaussian Low Pass Filter to blur the original image to consider only lower frequencies, as higher frequencies could result in distortion after subsampling.

The difference in results after and before pre-filtering can be visualized by the below snapshots of the result:

Image1 : Unfiltered YUV-311

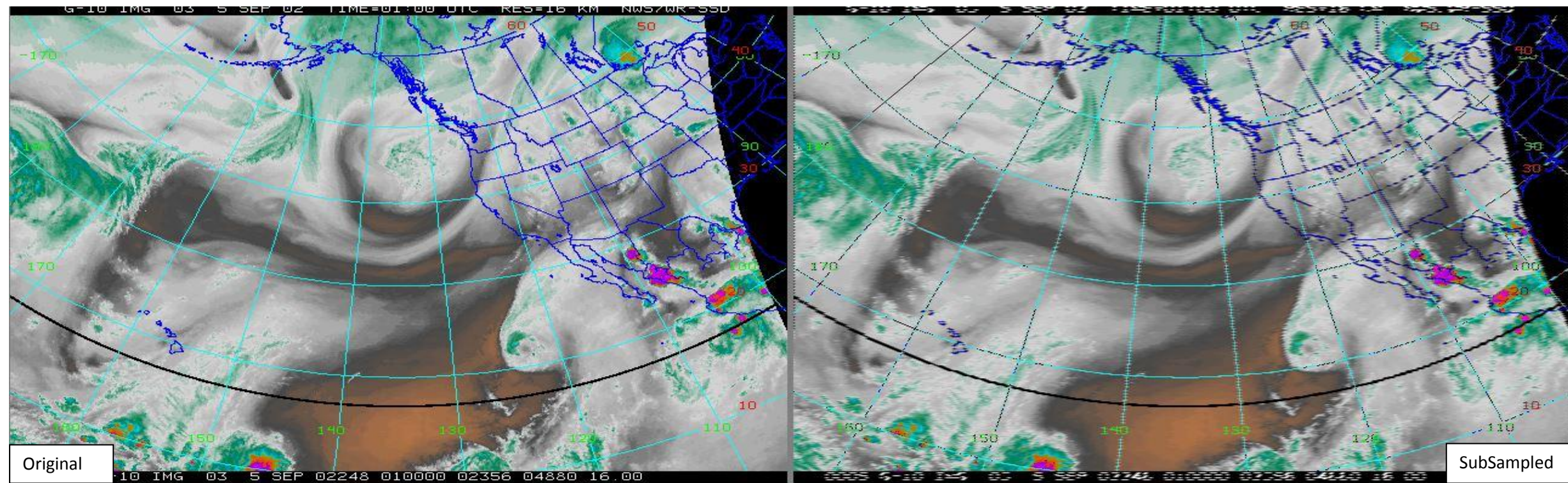


Image1 : Prefiltered YUV-311

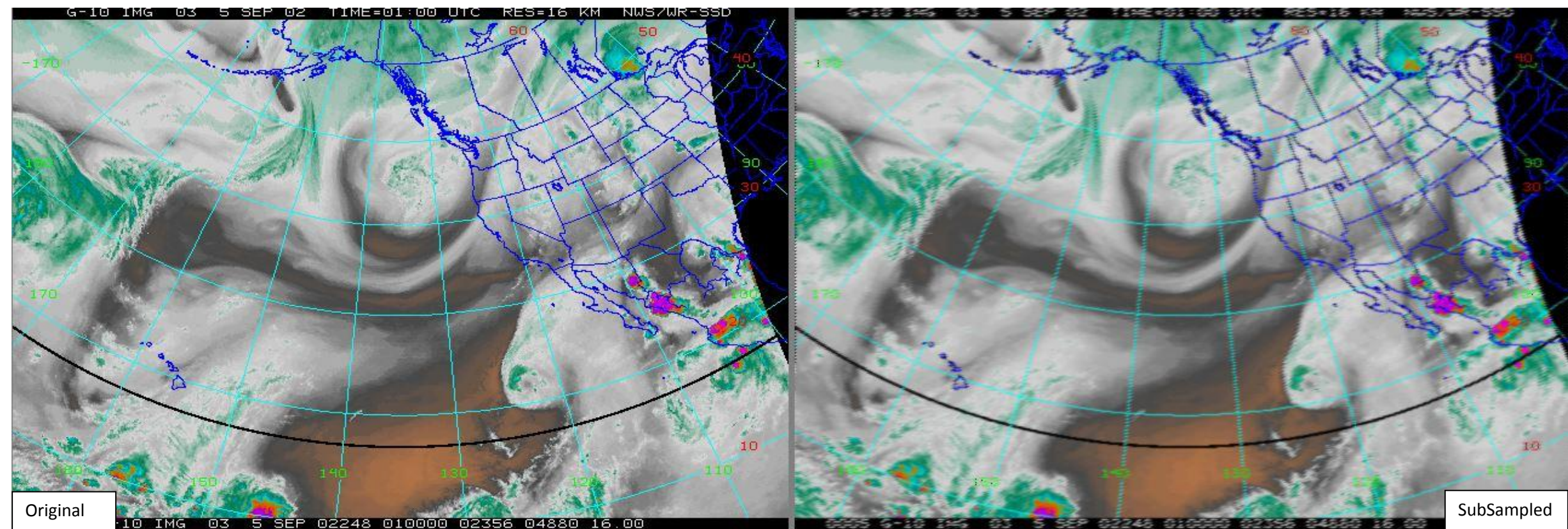


Image1 : Unfiltered YUV-211

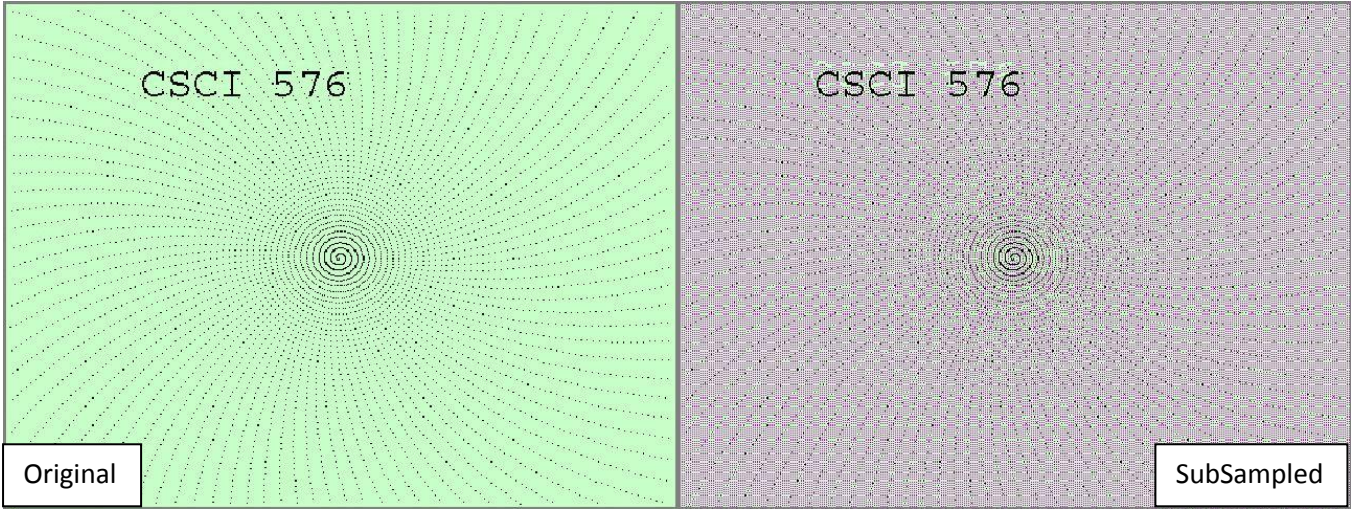


Image2: Unfiltered YUV-121

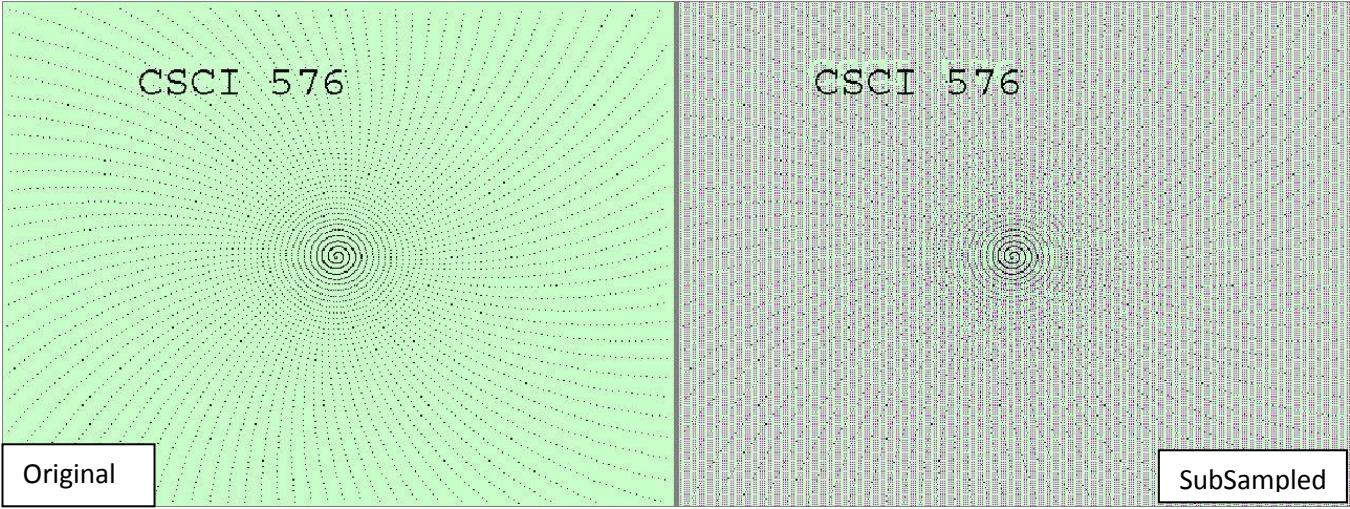


Image2 : Prefiltered YUV-211

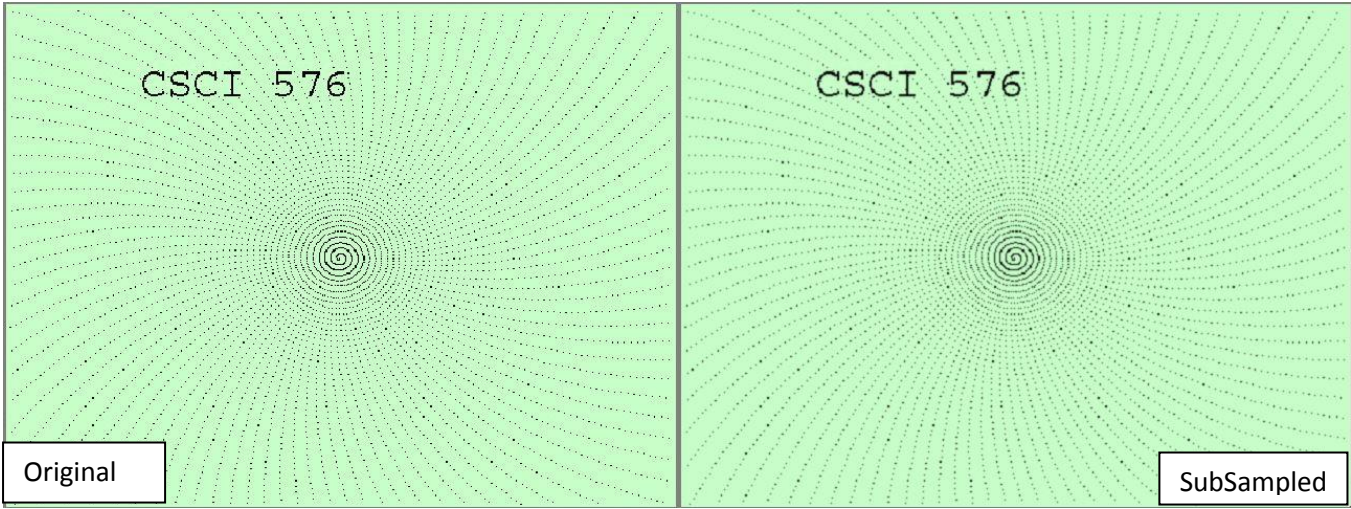


Image1 : Unfiltered YUV-121

