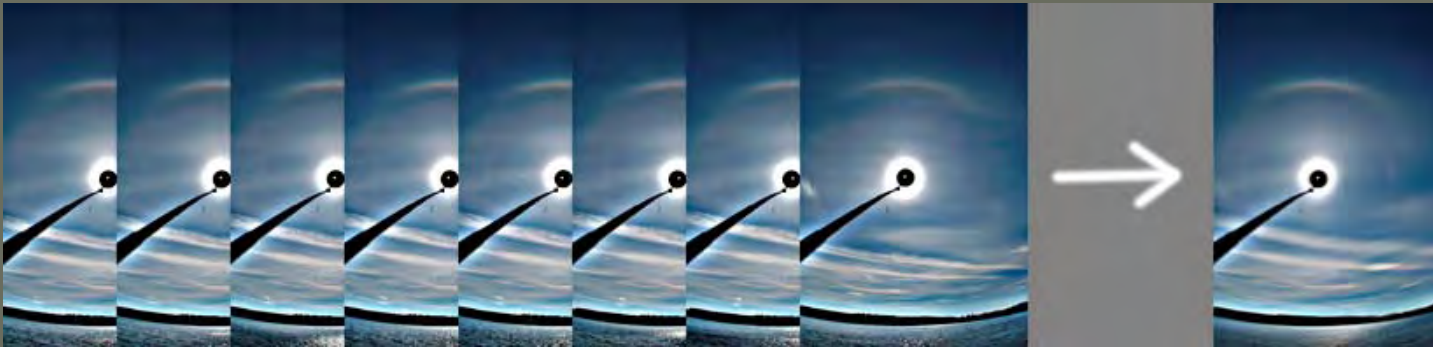# Stacking technique in halo photography

What is stacking?

- several images are superposed to one image

- halos stand you better because clouds move but halos don't

Aligning images

here are stacked two images 10 minutes apart

aligning the frames of the image

aligning the sun

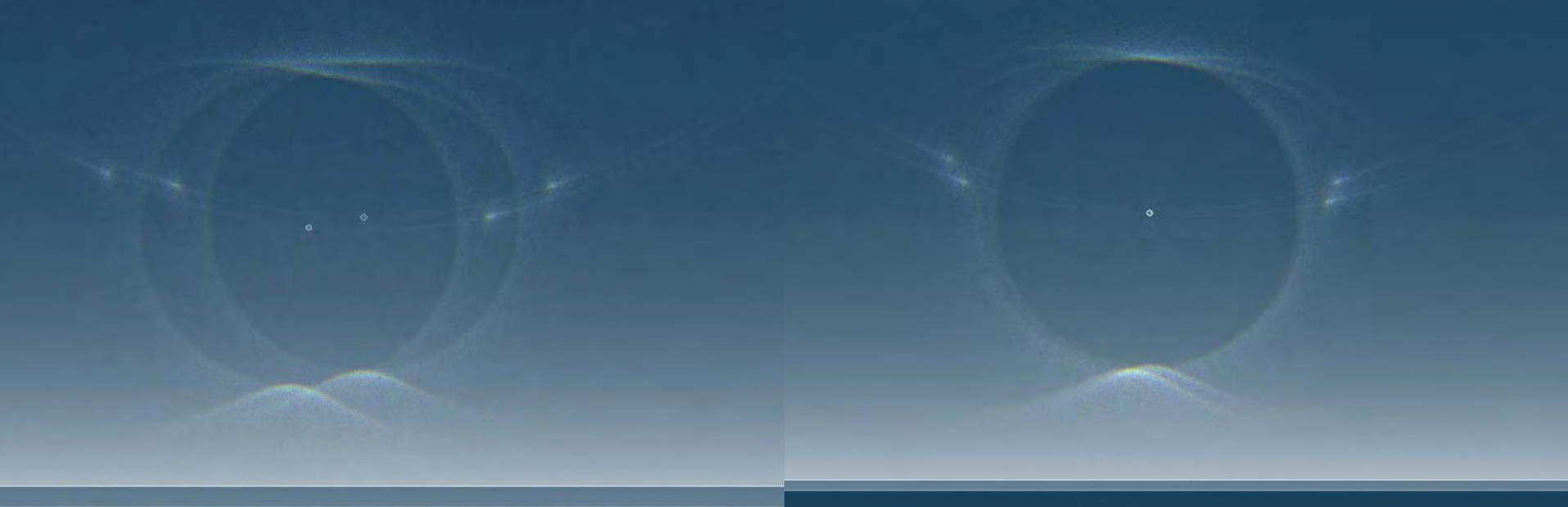# Aligning images

rectilinear projection

2° ats - 1° elev

- small movement of the sun does not matter

Aligning images

rectilinear projection

10° ats - 2° elev

- halos don't align with big movement

Aligning images

here are stacked two images 10 minutes apart

aligning the frames of the image

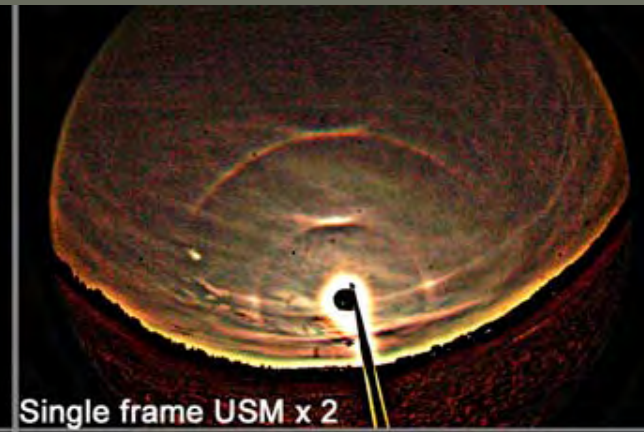aligning the sun

To USM or not?

Original   Unsharp masked

unsharp masking does good for the halos discernibility

To stack or not?

Single frame

Single frame USM

Single frame USM x 2

73 frames

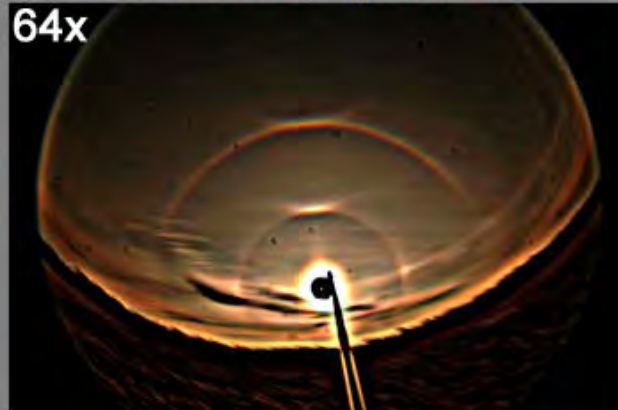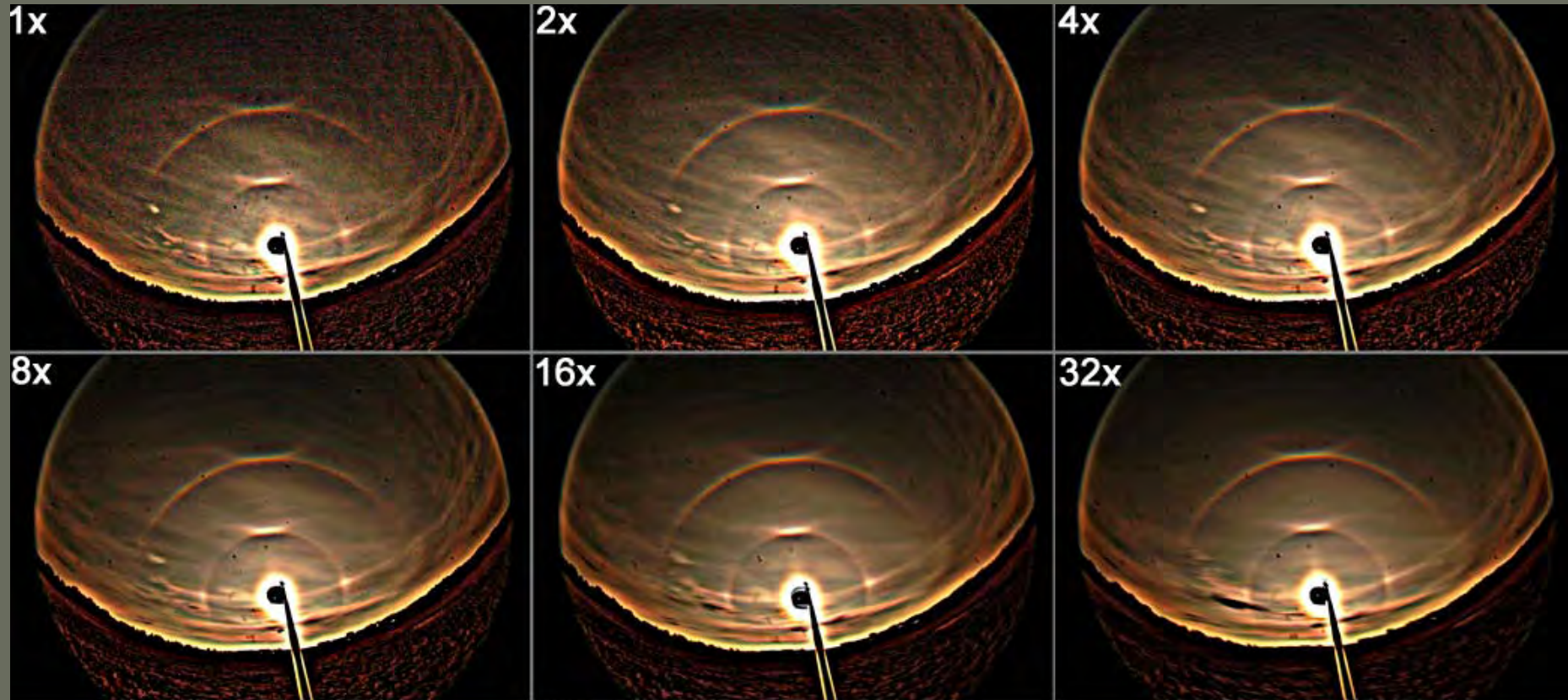73 frames USM

73 frames USM x 2

stacking alone does not do that much wonders

combined with usm it starts to work

second usm round brings out the best of stacking

How many frames to stack?

1x 2x 4x
8x 16x 32x
64x

Wegener appears when several images are stacked

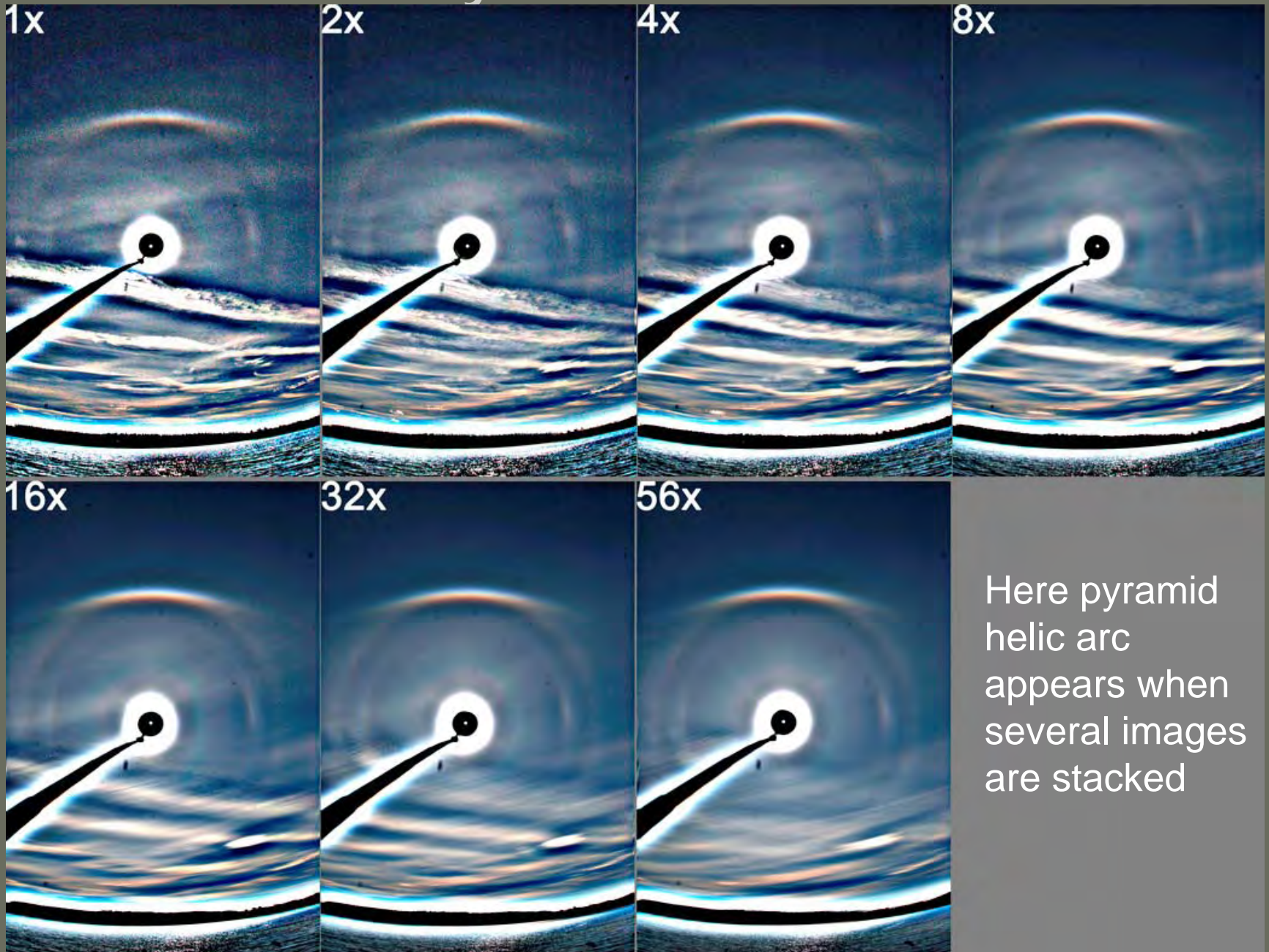Also the artefacts become less disturbing

How many frames to stack?

1x   4x   8x   16x   32x
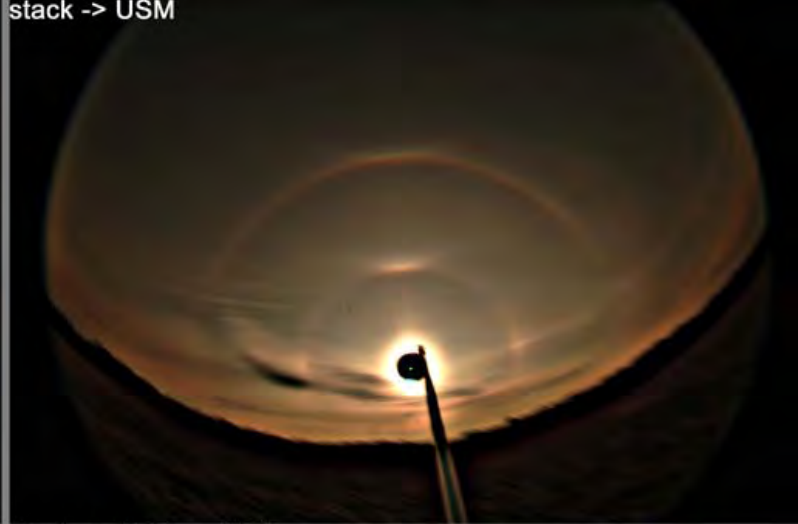
How many frames to stack?

1x 2x 4x 8x

16x 32x 56x

Here pyramid helic arc appears when several images are stacked

Effect of USM and stacking order

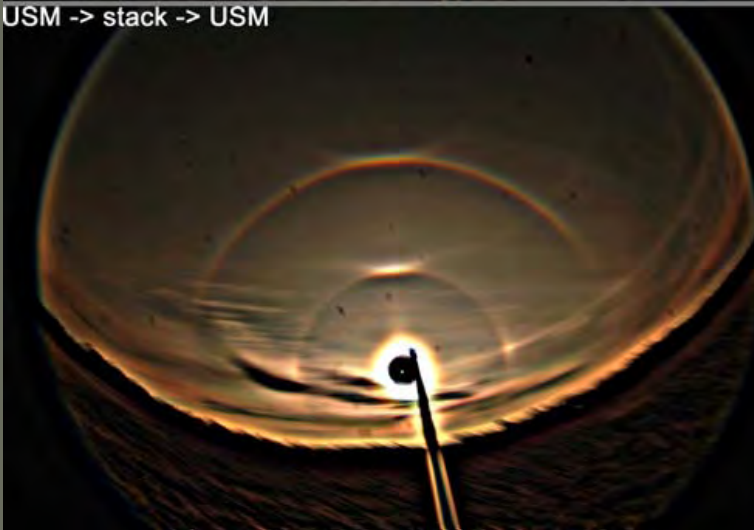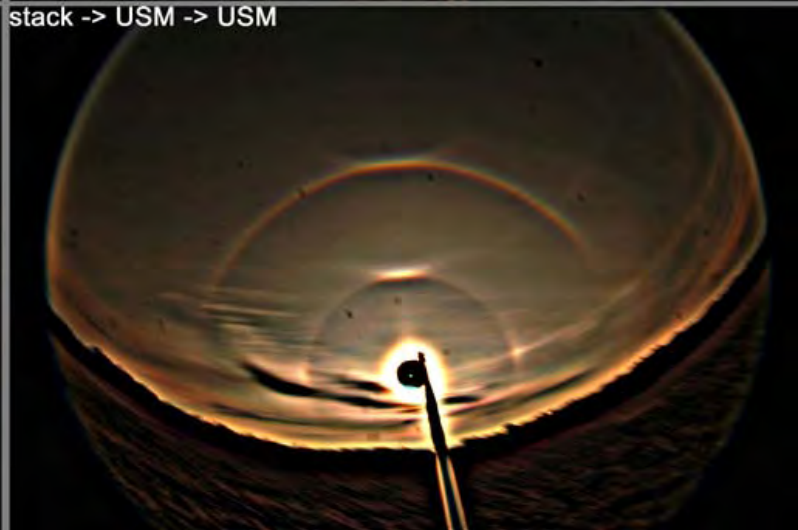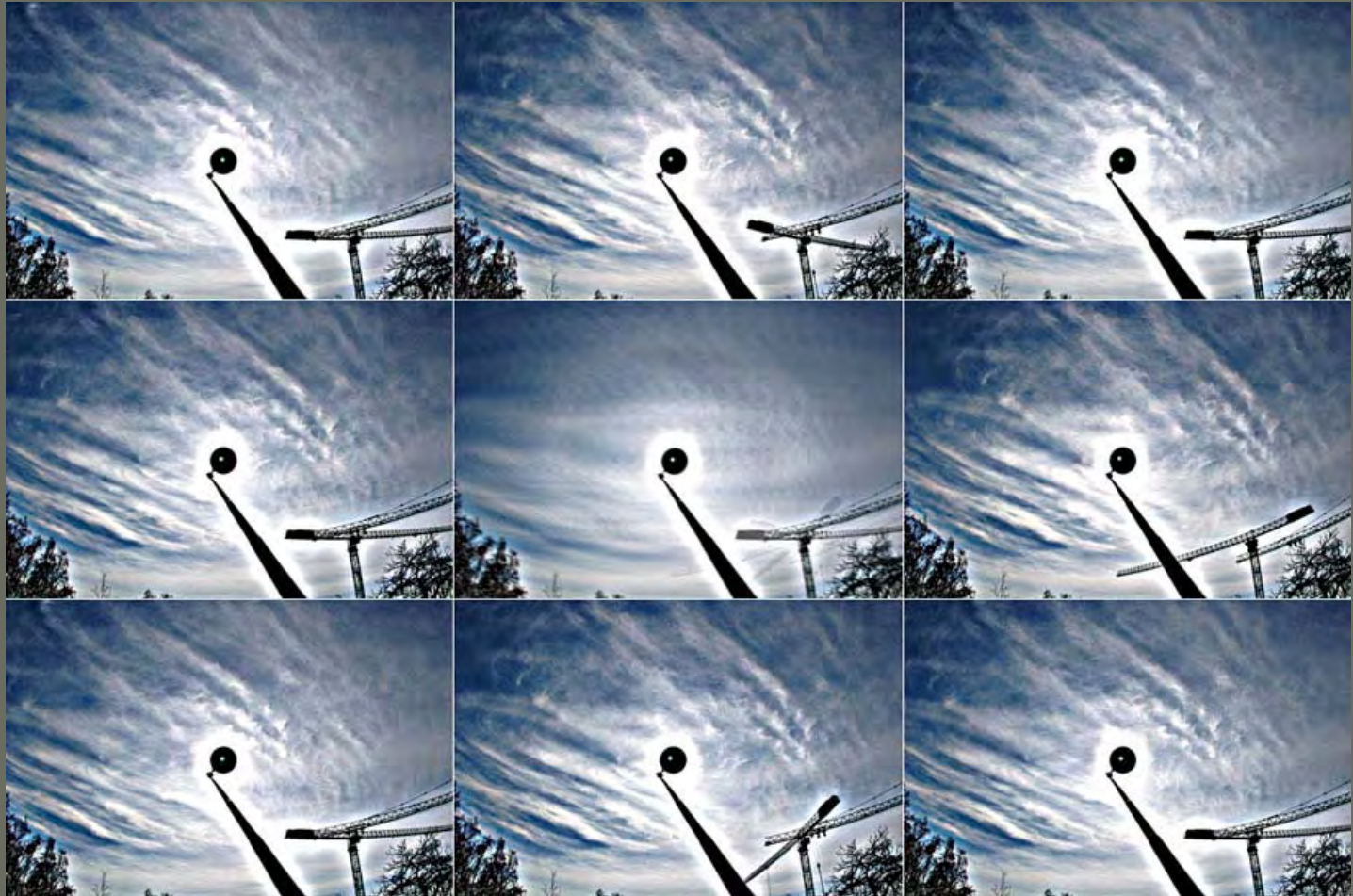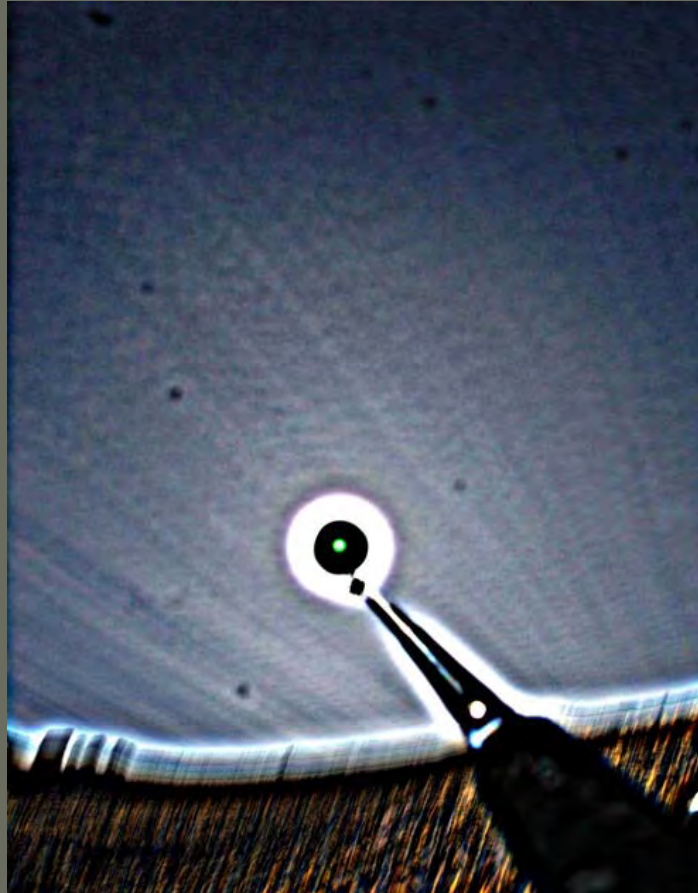Stacking / USM order does not matter

Stacking helps for cryptic halos

Visually this display had clear patches of
22 halo, but they did not show up in photos

Frustrated of high clouds showing no halos?
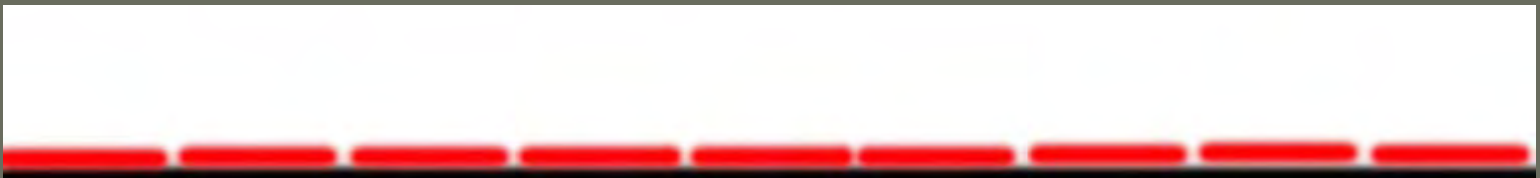

stacking helps

8 bit or 12 bit?

• less aftefacts when taking photos in 12-bit RAW-mode
• working with RAW-images consumes more time
• RAW also consume much more memory card space

Interval of photography
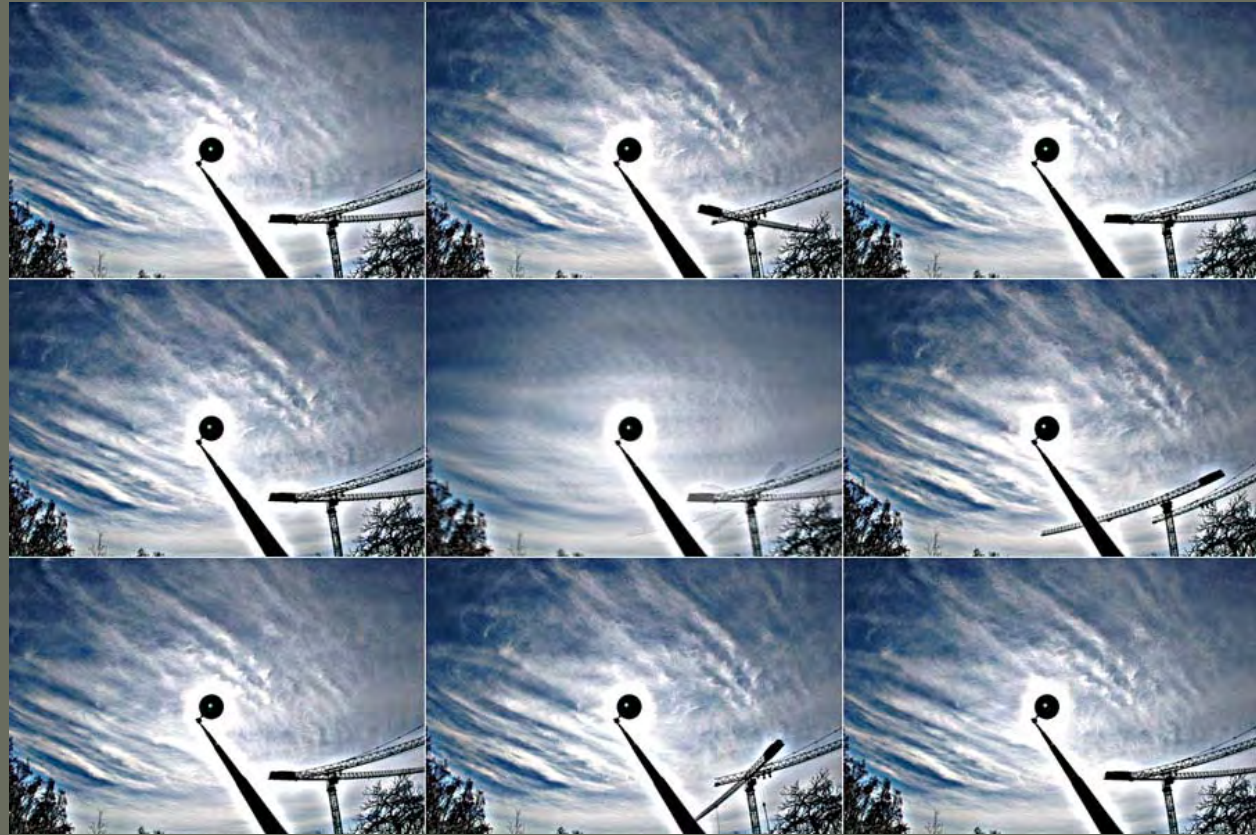
- I take usually a photo every 10-15 seconds

- long exposures with ND-filter fills the void

interval of photography

- if the interval between shots is long, this may result in scaly looks of the cloud

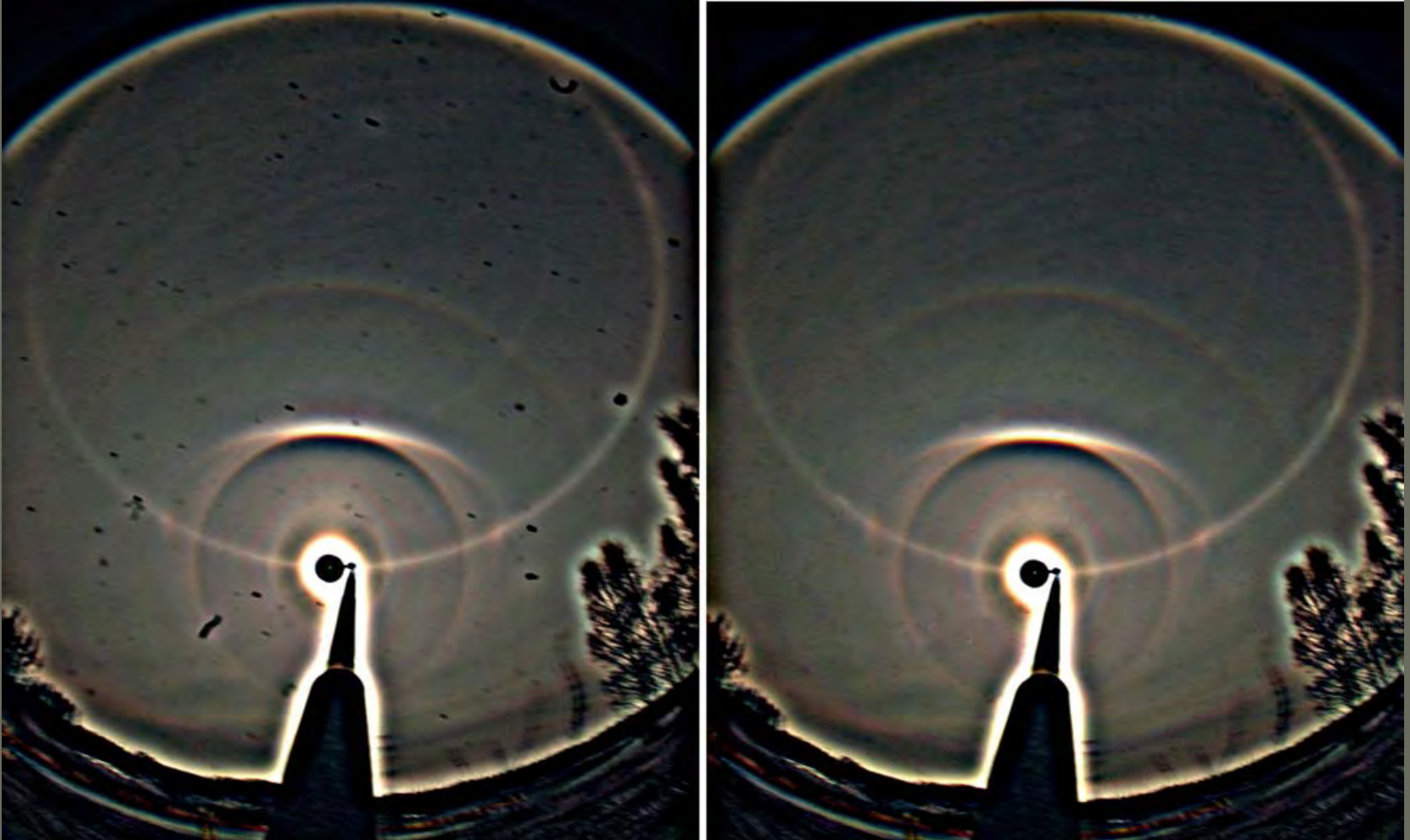# Benefits from stacking are case sensitive

- not much improvement with smooth clouds

Benefits of stacking are case sensitive

- works best with irrgular clouds
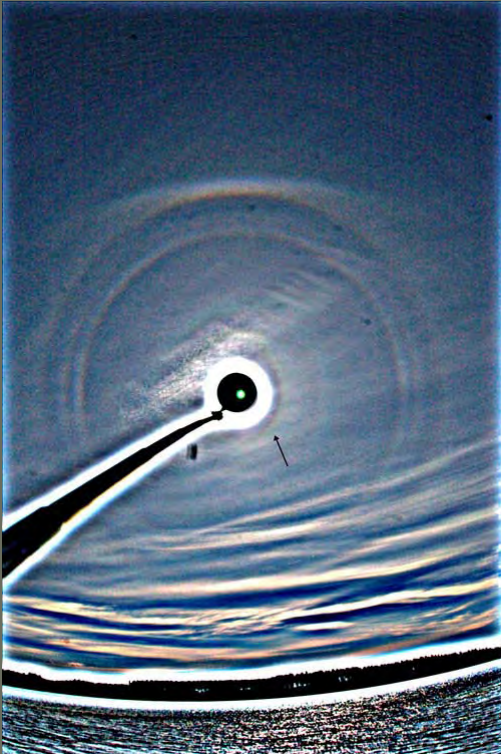
Downsides

- dust

Downsides

- consumes time – especially RAW format

- acessories needed: at least tripod and blocker

- some don't like the looks of stacked images

Downsides

- artefacts

is this 9° halo or artefact?

is this some kind
of 5° arc?

aftefacts can be avoided largely with 12-bit photos

Benefits

- increases halo definition by removing irregularities of the clouds

- shows halos that are not seen with naked eye

- shows subtle features

- makes the high cloud displays better comparable with simulations