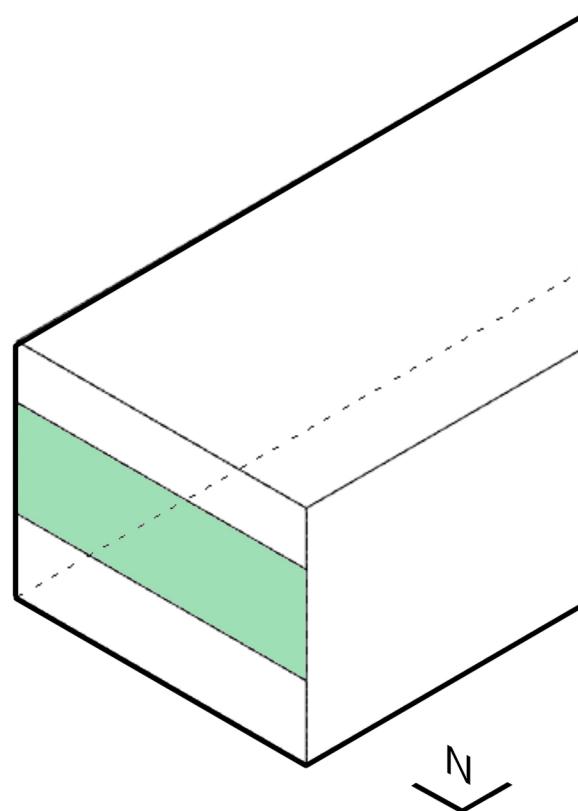
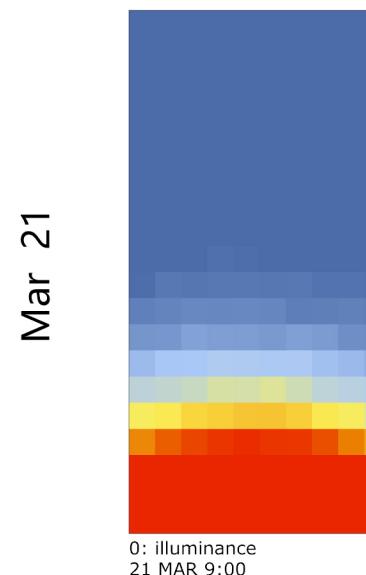


DAYLIGHTING 1

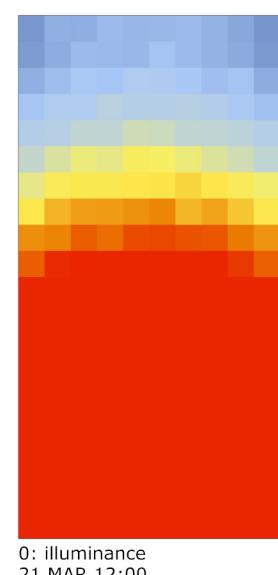
Tan, Shengji



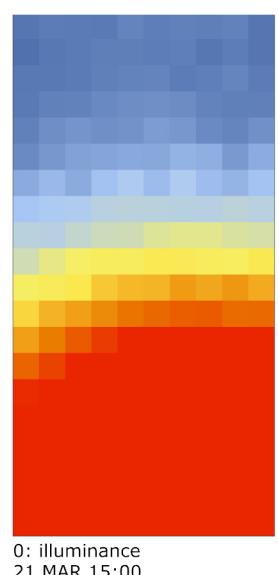
AM 9:00



PM 12:00



PM 15:00

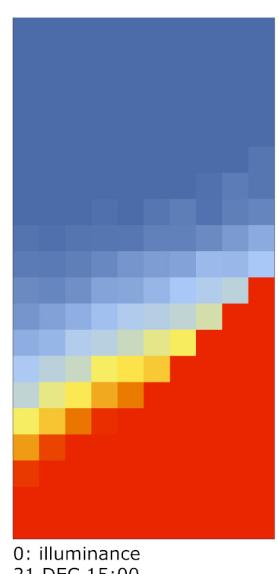
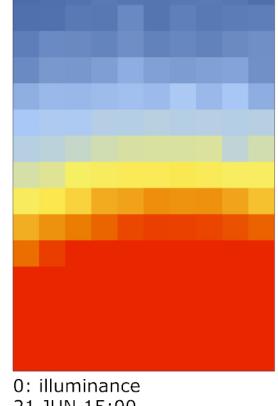
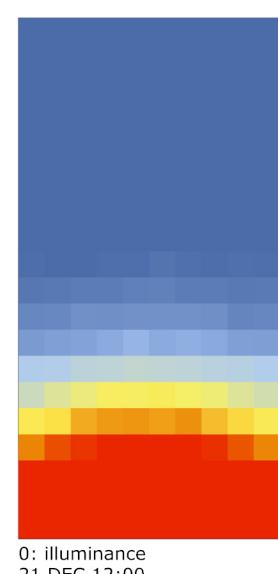
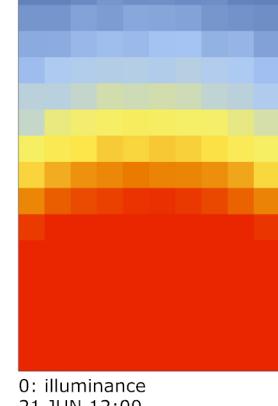


Mar 21

Jun 21

Dec 21

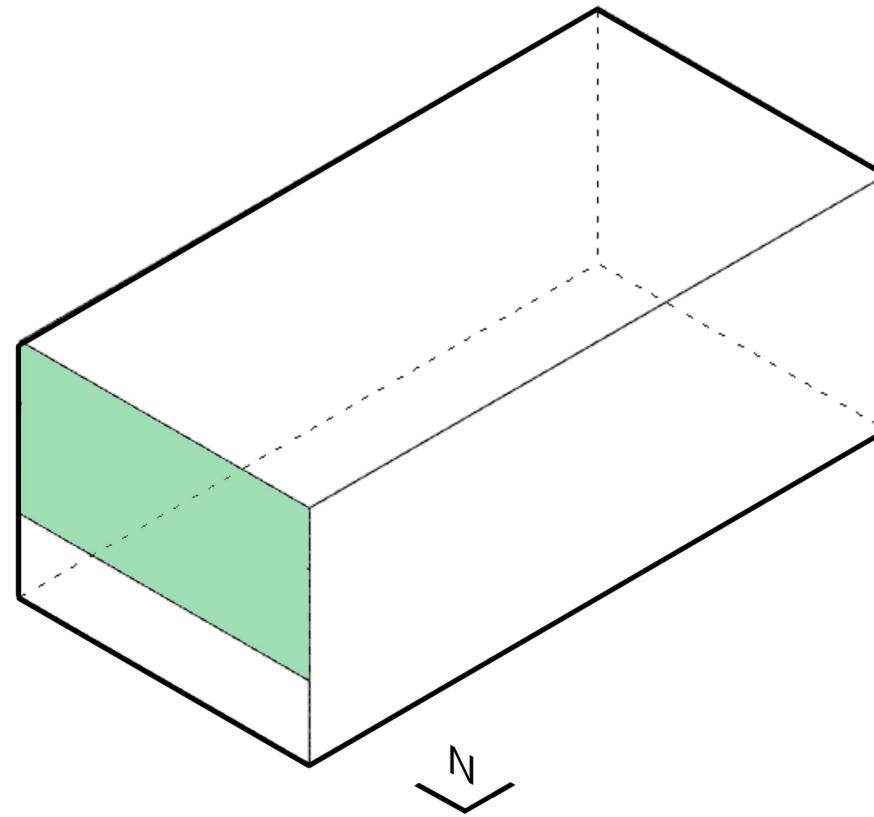
Dec 21



According to diagrams generated by ladybug, the the area near the windows is overwhelmed with daylight all the year. but the lux data on the other part indicates inadequate sunshine. The goal is to provide a method to insure the minimum daylight above 300 lux and maximum of 2000 lux for the apartment.

DAYLIGHTING 1

Tan, Shengji



Increasing the height of window is able to allow sunshine reach deeper, however it still cannot let the each space of the room obtain enough lux.

AM 9:00

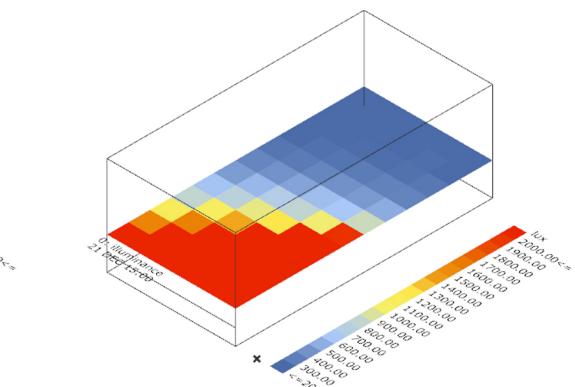
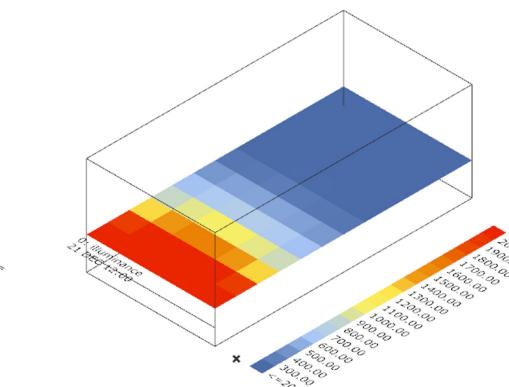
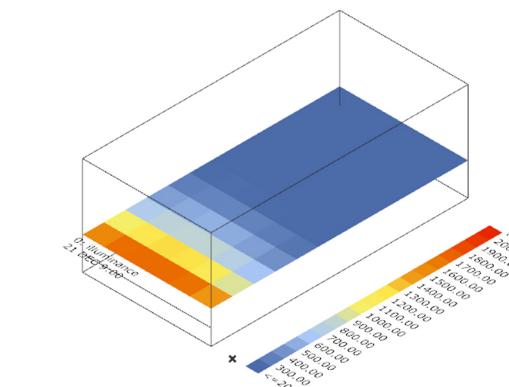
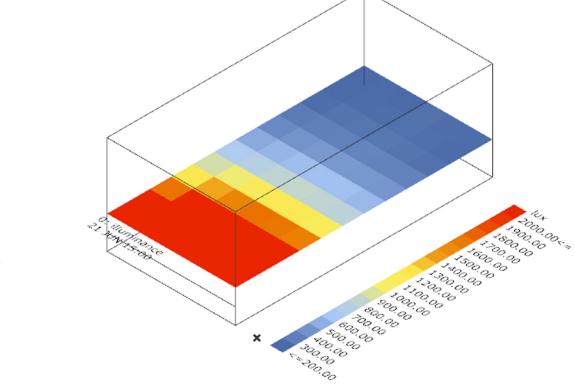
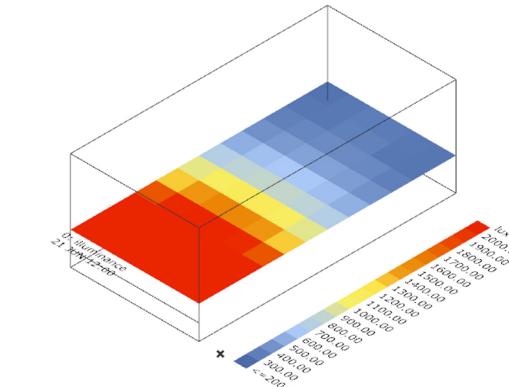
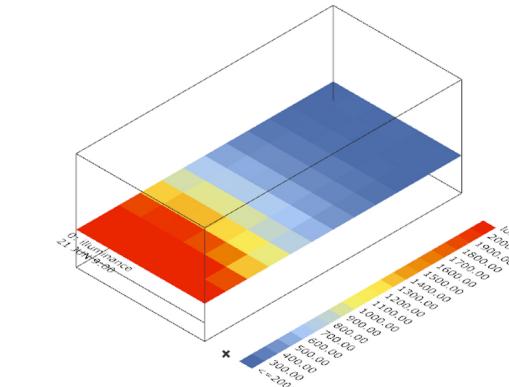
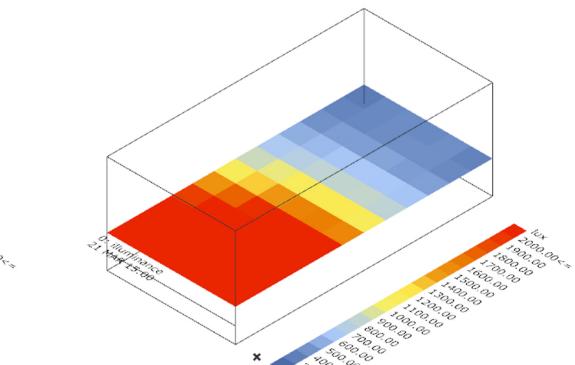
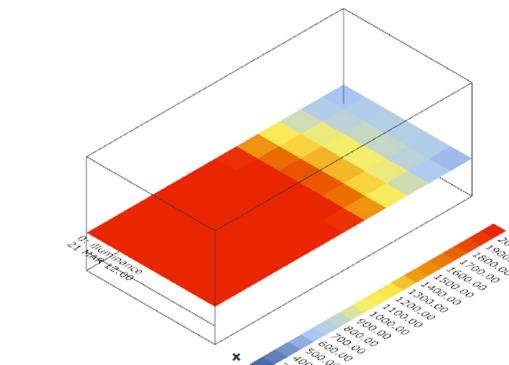
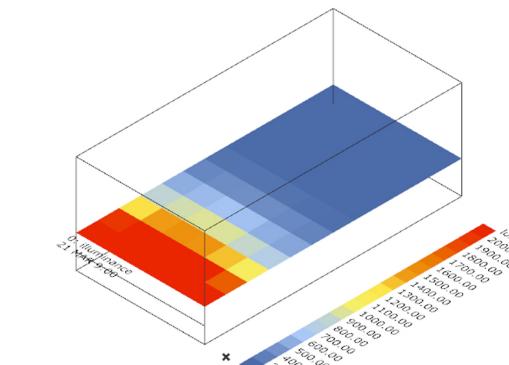
PM 12:00

PM 15:00

Mar 21

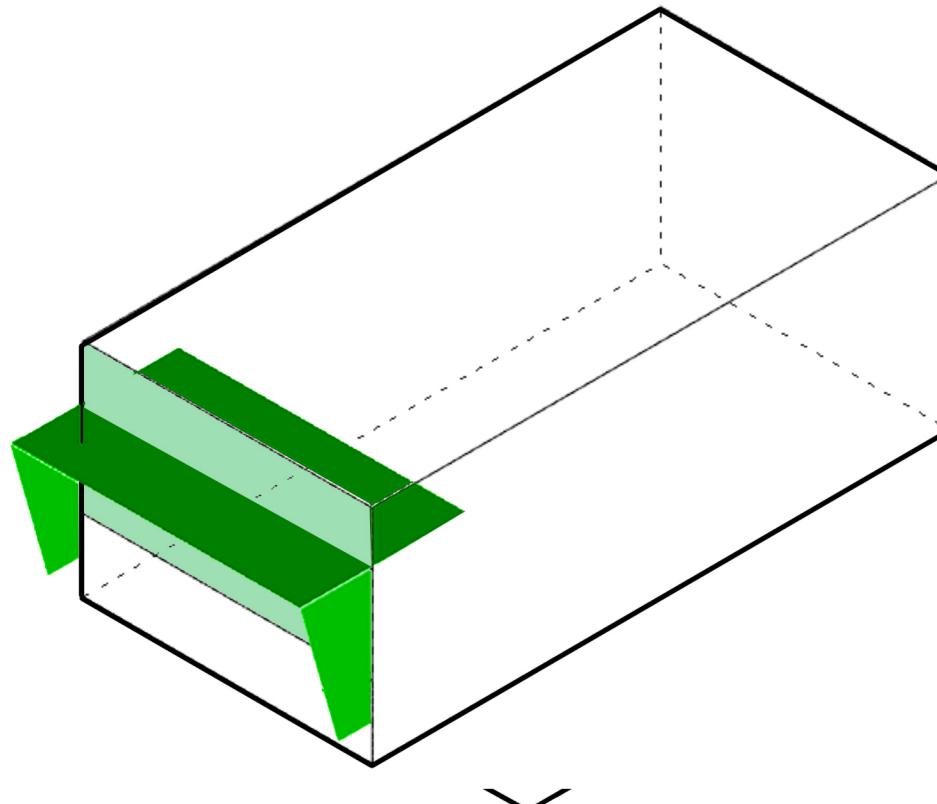
Jun 21

Dec 21



DAYLIGHTING 1

Tan, Shengji



AM 9:00

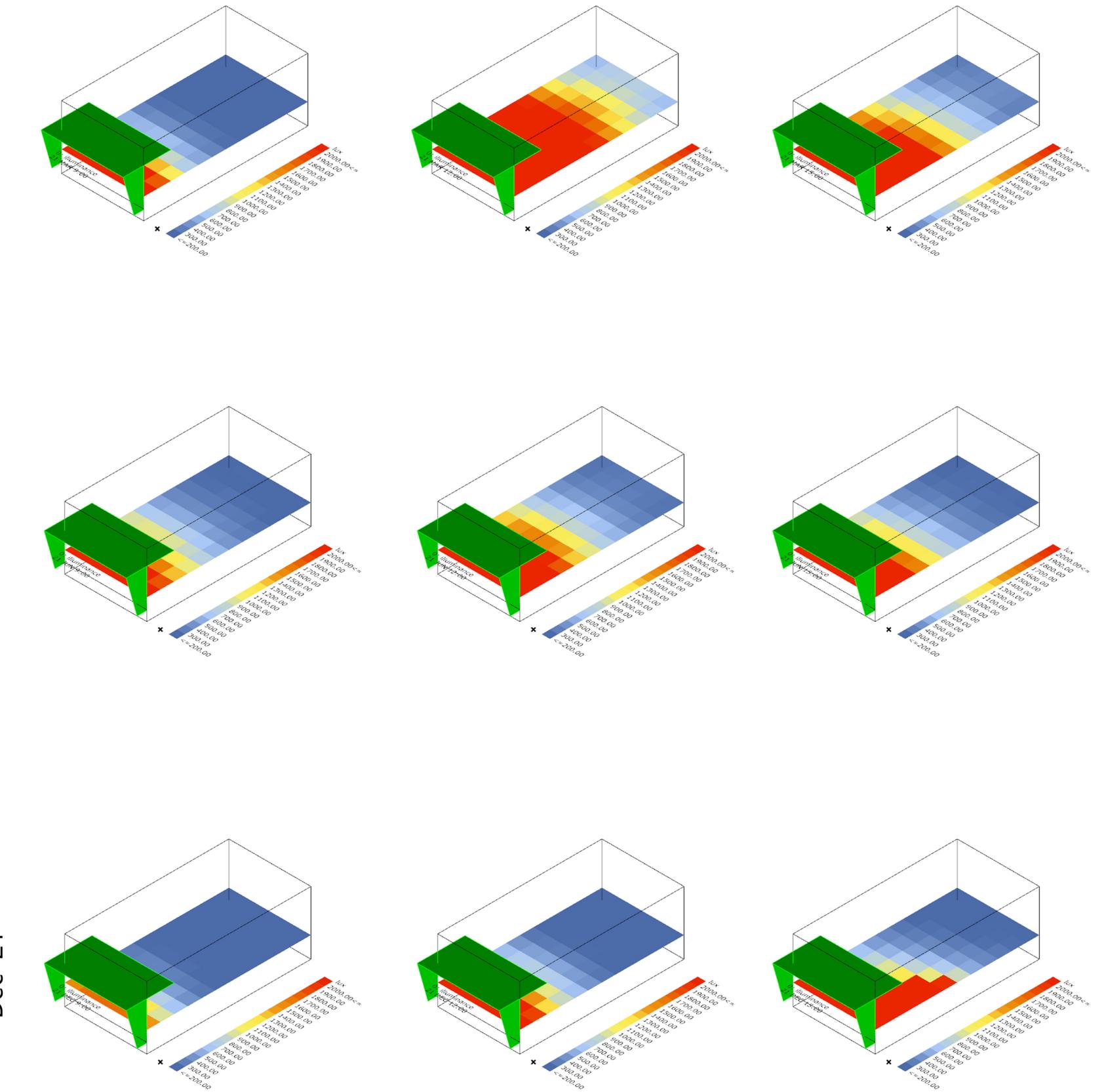
Mar 21

PM 12:00

Jun 21

PM 15:00

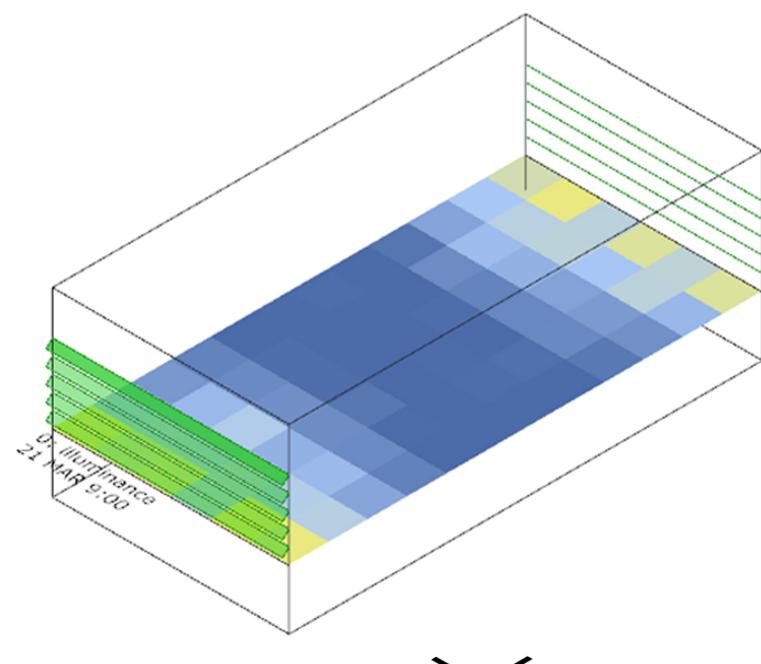
Dec 21



The introduction of reflective plate can enhance the effect of lighting in deeper part of the room, but again it still cannot achieve the desired results

DAYLIGHTING 1

Tan, Shengji

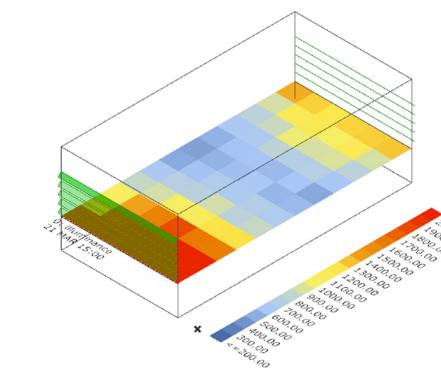
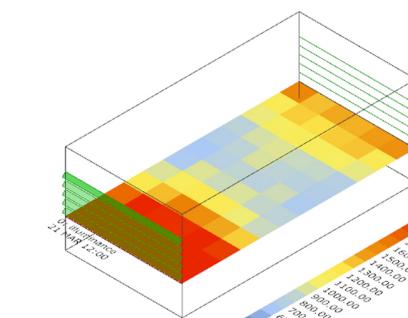
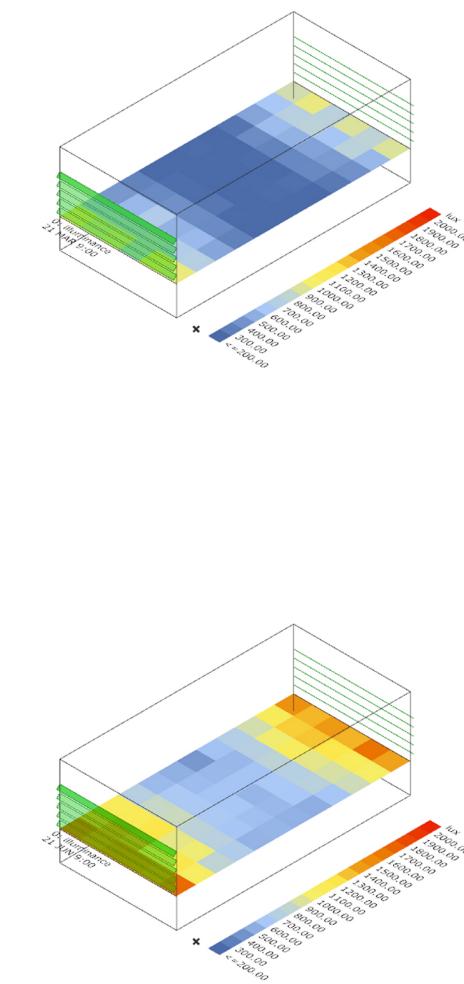


AM 9:00

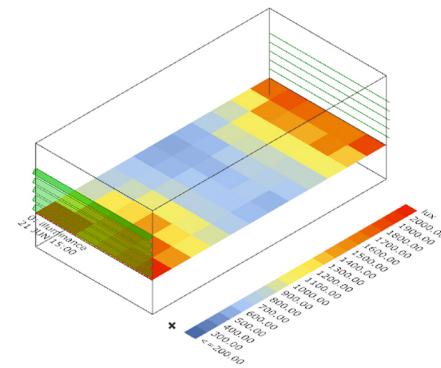
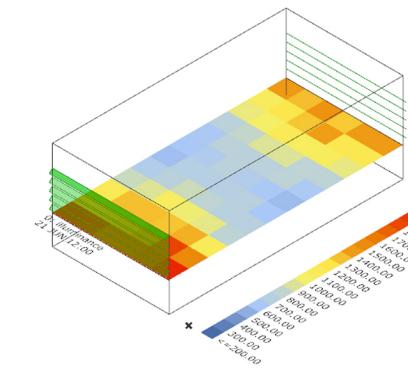
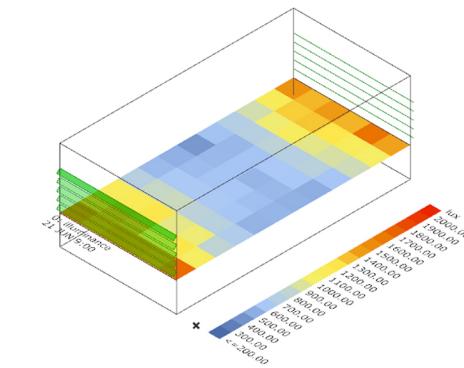
PM 12:00

PM 15:00

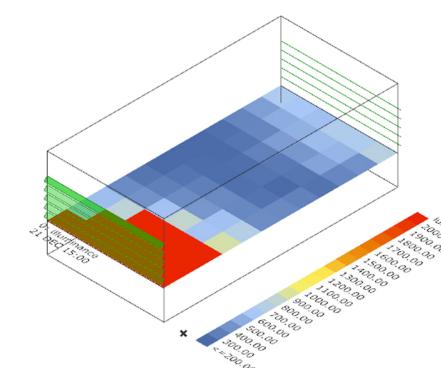
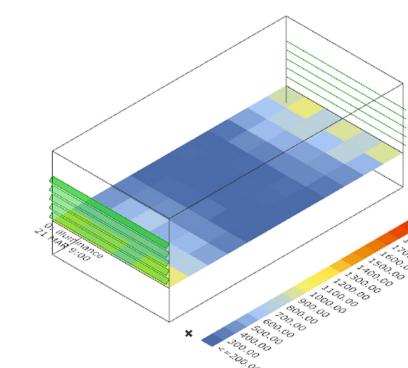
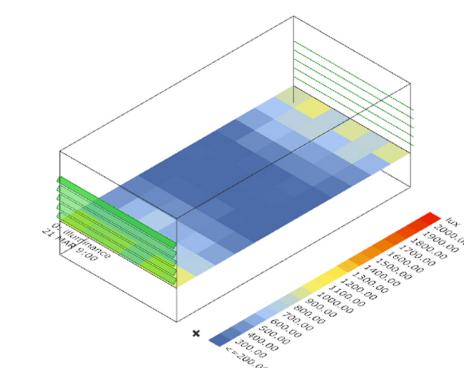
Mar 21



Jun 21



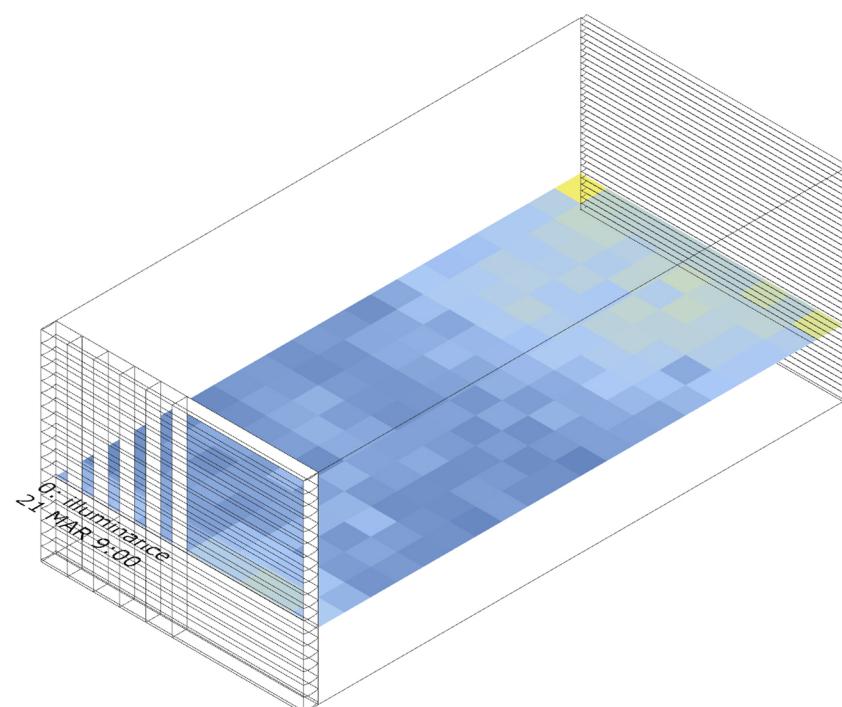
Dec 21



Installing window in the other side of the wall can greatly improve the quality of the daylighting in deeper part, and the horizontal blinds can decrease the overwhelming daylight effectively. But in Dec 21 15:00 there still be a serious glaring in some part.

DAYLIGHTING 1

Tan, Shengji



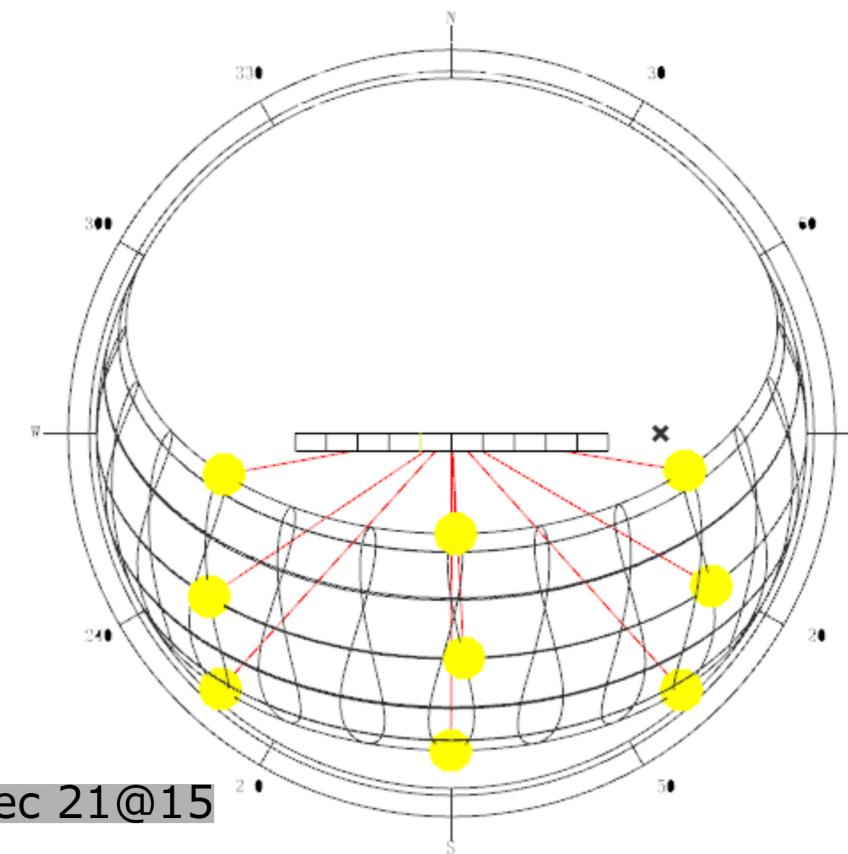
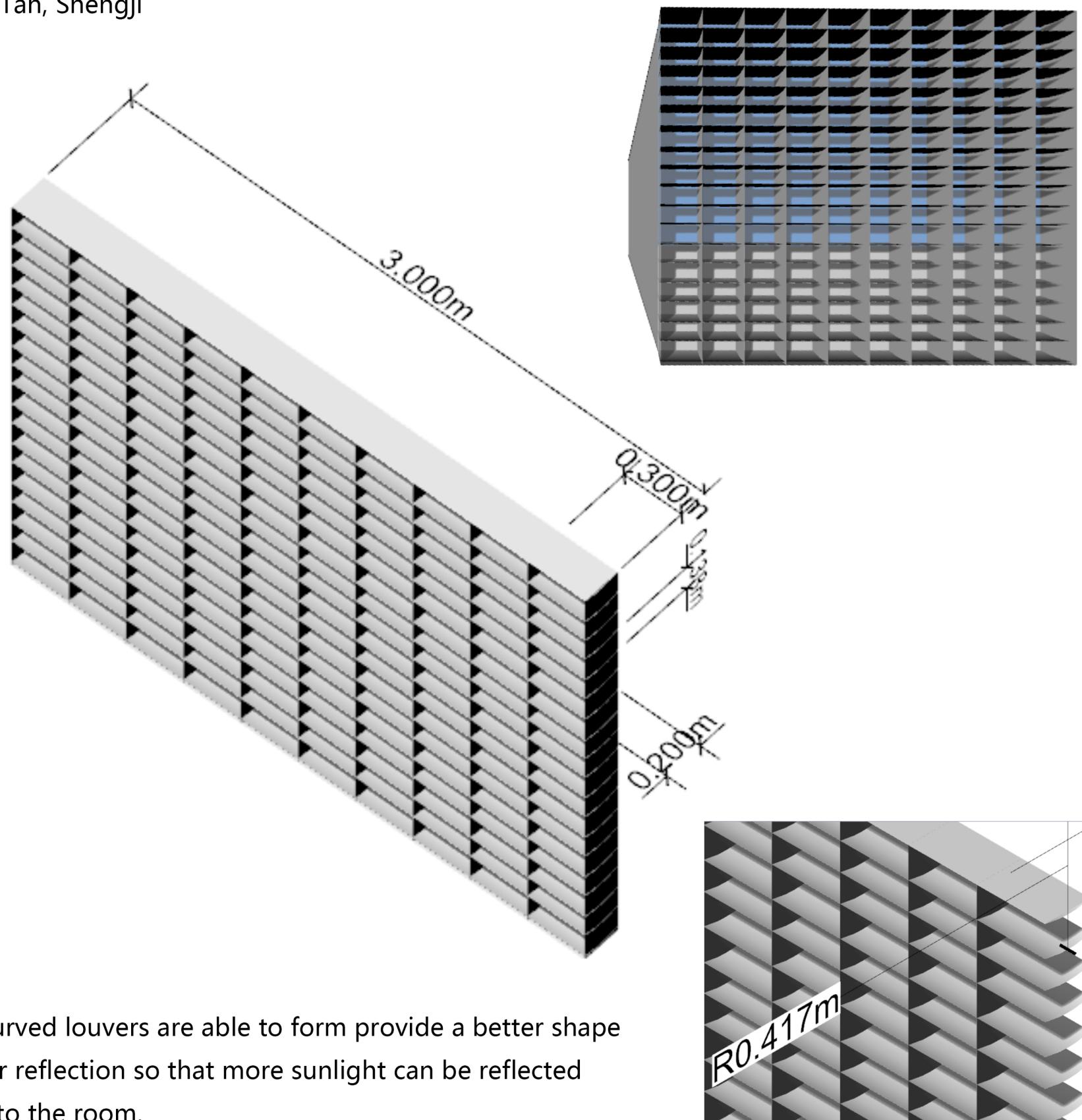
1

The figure displays a 3x3 grid of heatmaps representing solar irradiance (lux) across three months (Mar 21, Jun 21, Dec 21) and three time points (AM 9:00, PM 12:00, PM 15:00). Each heatmap shows a 2D spatial distribution of irradiance levels, with a color scale from blue (<=200.00 lux) to red (2000.00 <= lux). The x-axis for each heatmap is labeled "v. illuminance" and the y-axis is labeled "v. illuminance".

- Row 1: Mar 21**
 - AM 9:00:** Shows a high concentration of low irradiance (blue) in the lower half, transitioning to higher values (yellow/orange) in the upper half.
 - PM 12:00:** Shows a high concentration of high irradiance (orange/red) across the entire area.
 - PM 15:00:** Shows a high concentration of high irradiance (orange/red) in the upper half, with some lower values (yellow) appearing in the lower half.
- Row 2: Jun 21**
 - AM 9:00:** Shows a high concentration of low irradiance (blue) in the lower half, transitioning to higher values (yellow/orange) in the upper half.
 - PM 12:00:** Shows a high concentration of high irradiance (orange/red) across the entire area.
 - PM 15:00:** Shows a high concentration of high irradiance (orange/red) in the upper half, with some lower values (yellow) appearing in the lower half.
- Row 3: Dec 21**
 - AM 9:00:** Shows a uniform high concentration of low irradiance (blue).
 - PM 12:00:** Shows a high concentration of low irradiance (blue) in the lower half, transitioning to higher values (yellow/orange) in the upper half.
 - PM 15:00:** Shows a high concentration of low irradiance (blue) in the lower half, with a few isolated high-irradiance pixels (red) appearing in the bottom right corner.

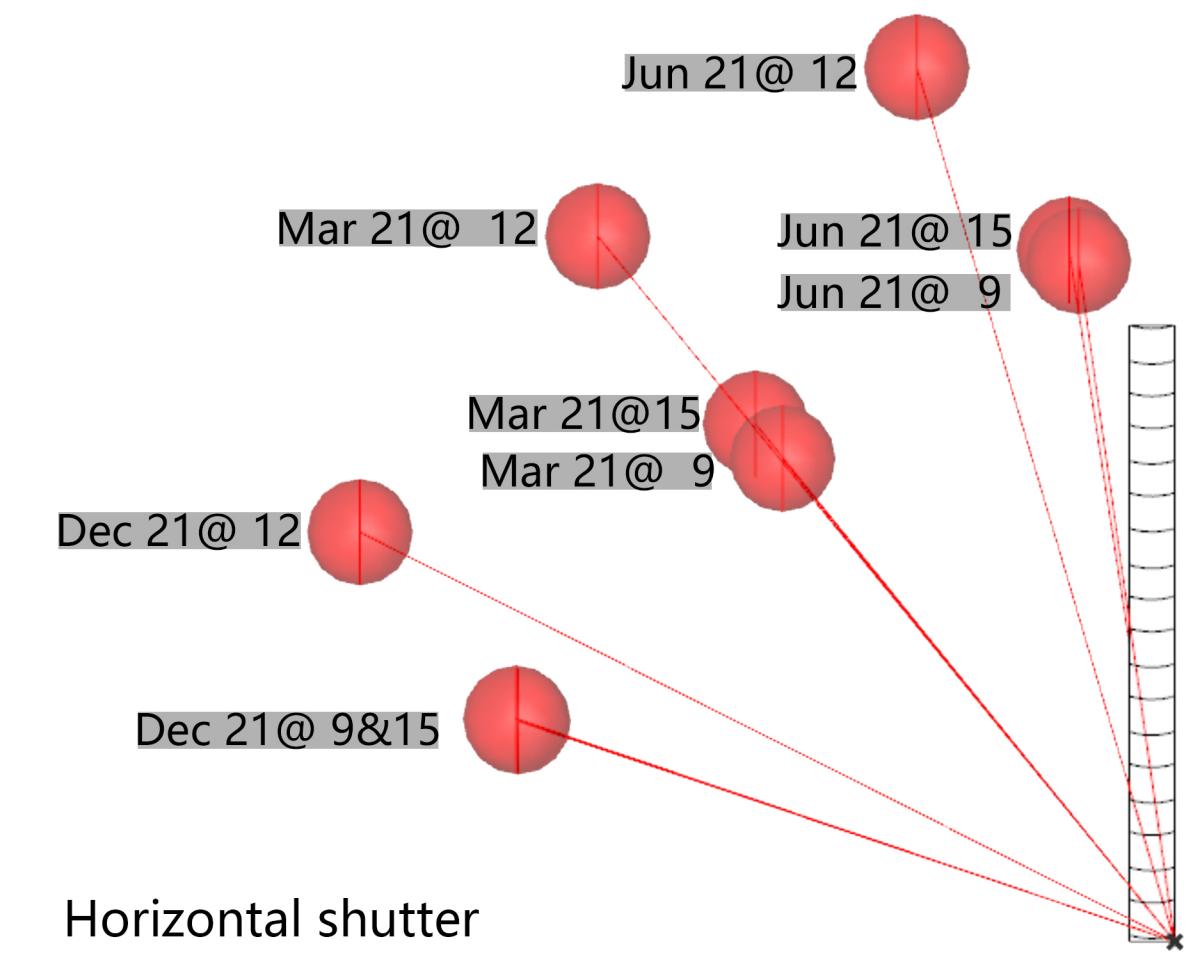
DAYLIGHTING 1

Tan, Shengji



Vertical shutter

1 To block the direct sunlight in Dec 21@15pm



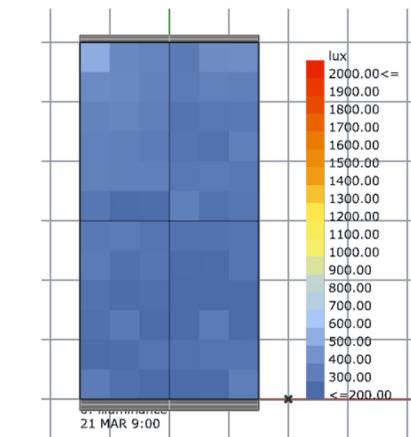
Horizontal shutter

1 To block the direct sunlight in spring and summer,
2 To allow the winter sunlight shine directly into the room directly

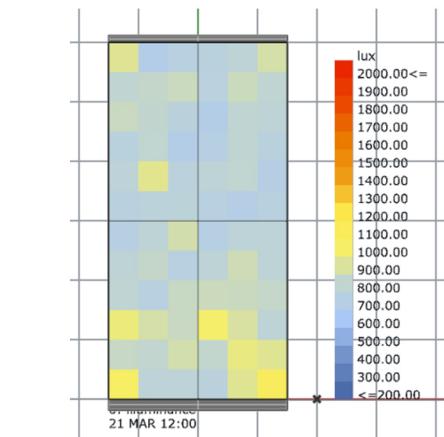
DESIGN PROCESS

AM 9:00

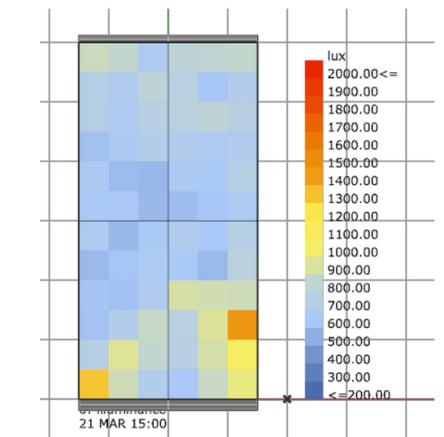
Mar 21



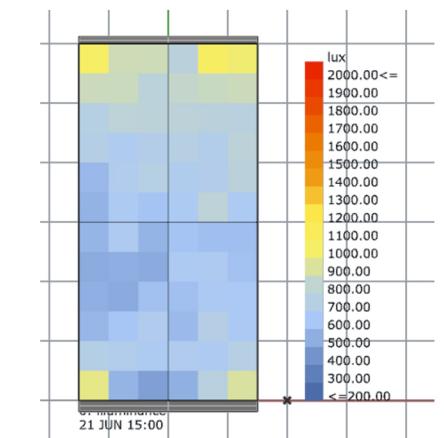
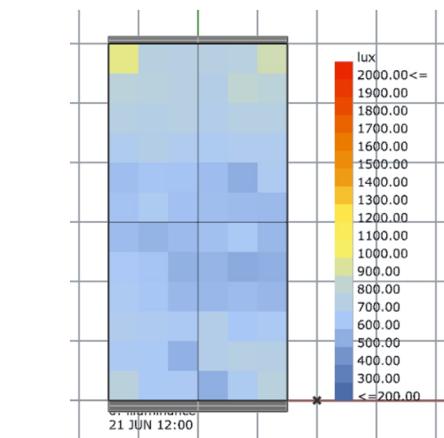
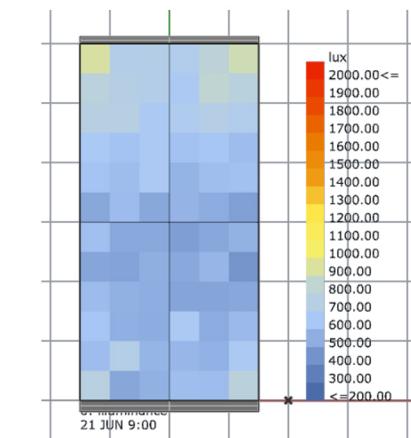
PM 12:00



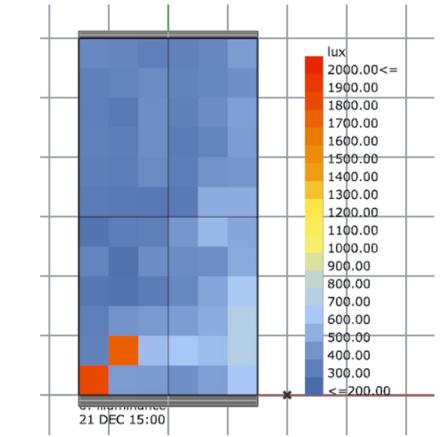
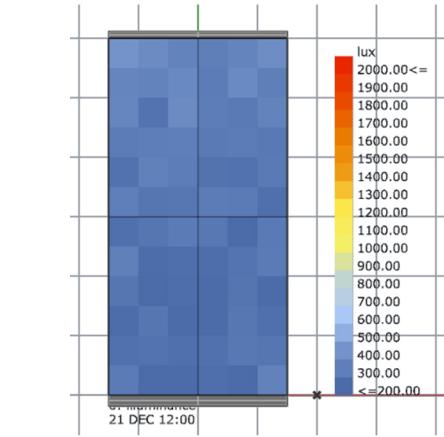
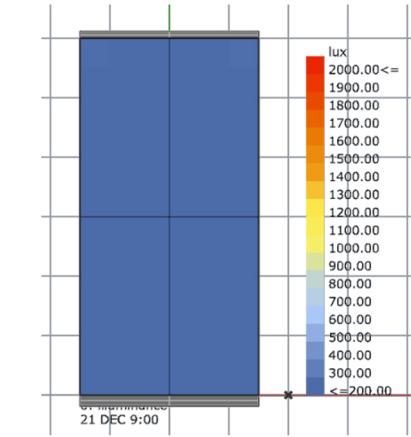
PM 15:00



Jun 21



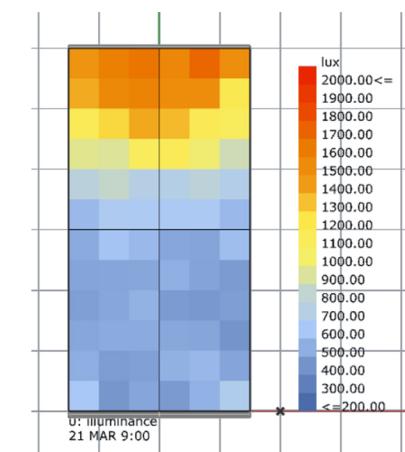
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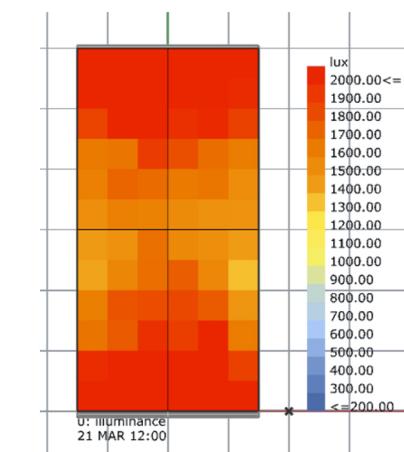
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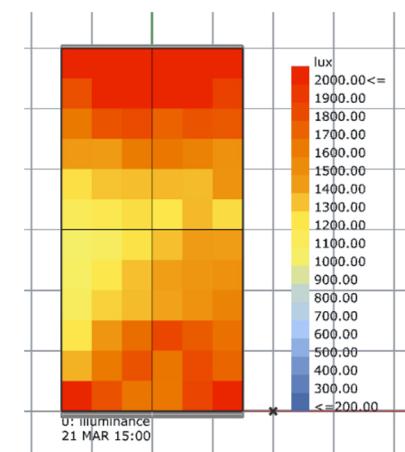
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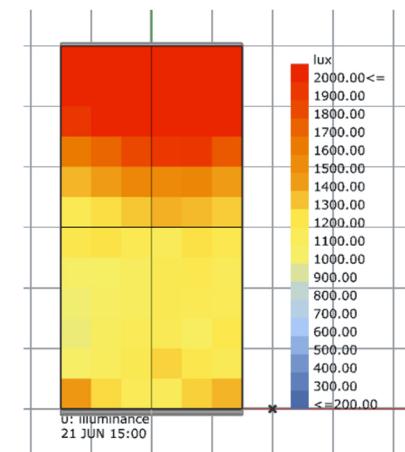
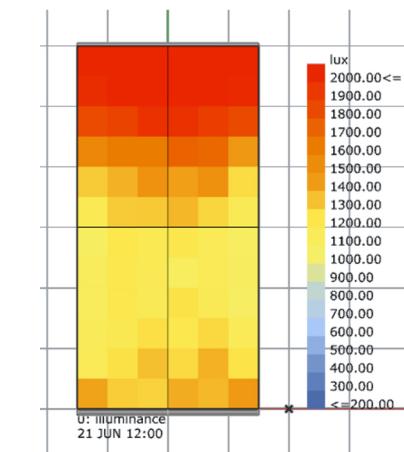
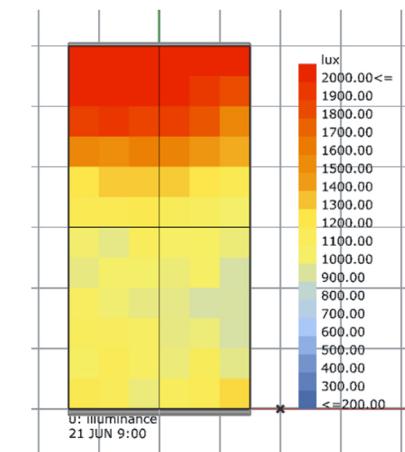
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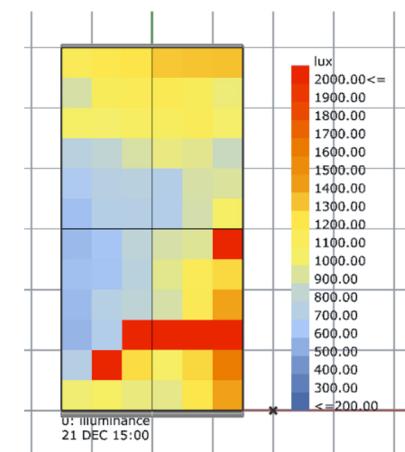
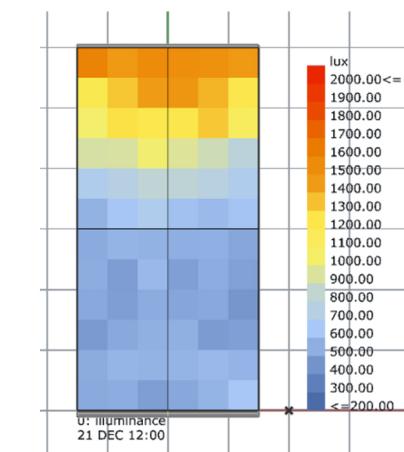
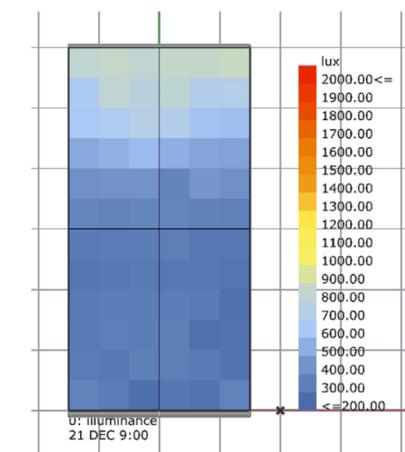
PM 15:00



Jun 21



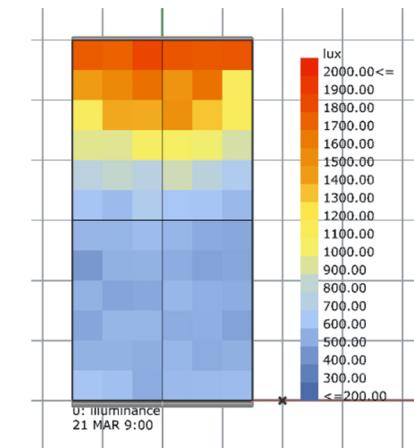
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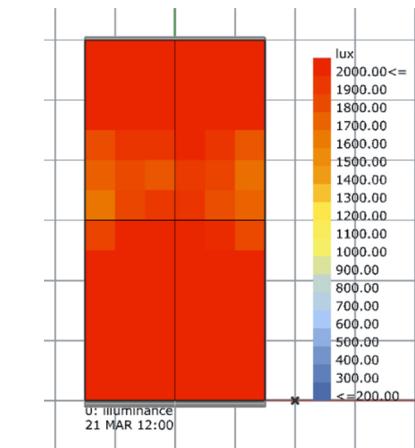
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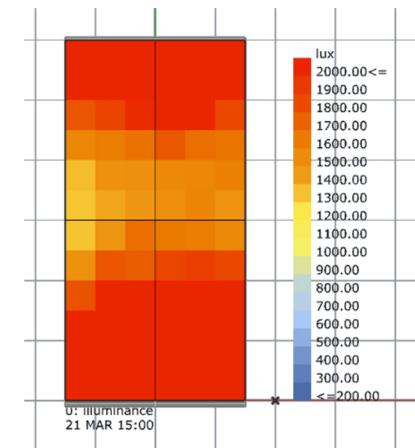
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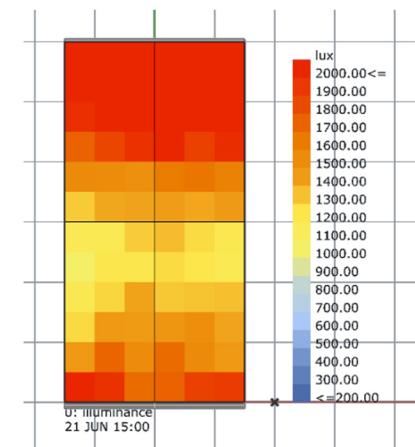
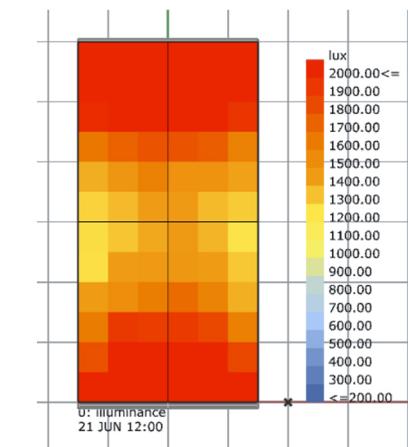
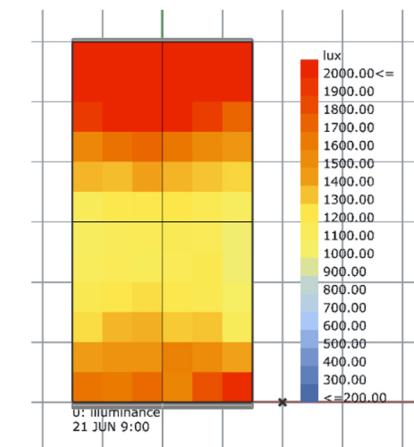
PM 12:00



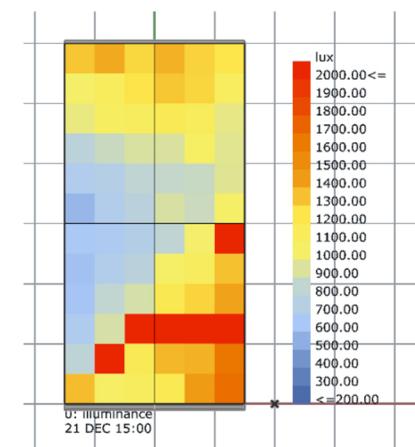
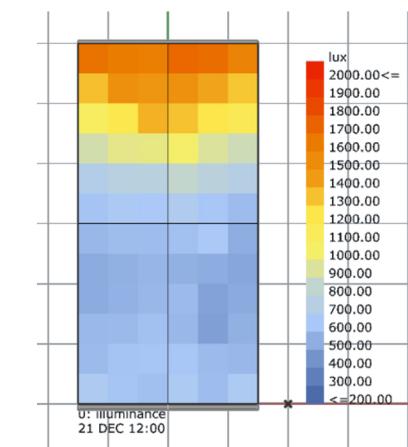
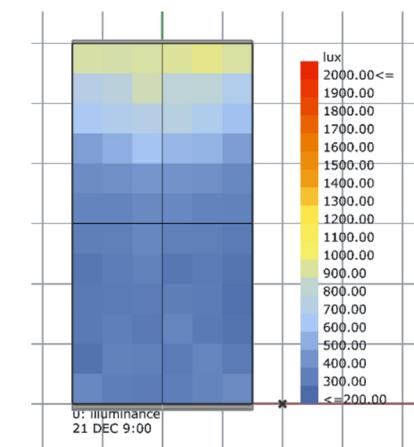
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Jun 21

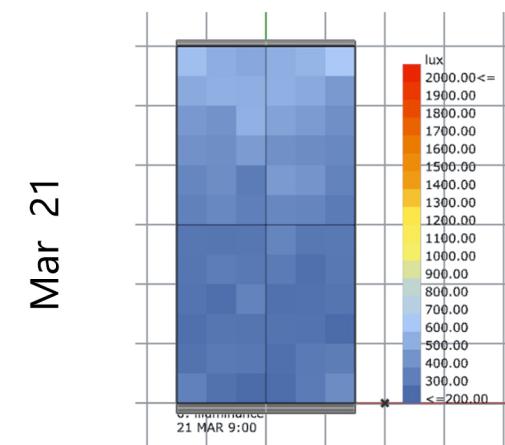


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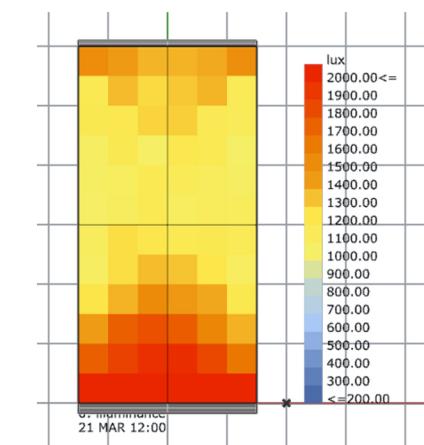


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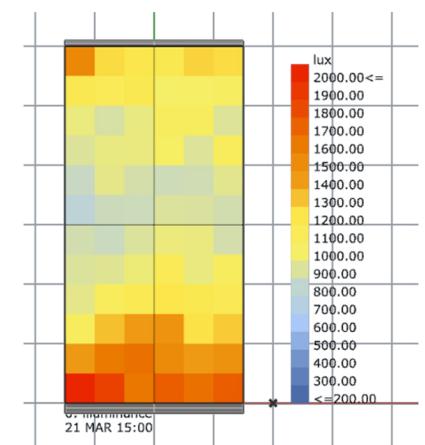
AM 9:00



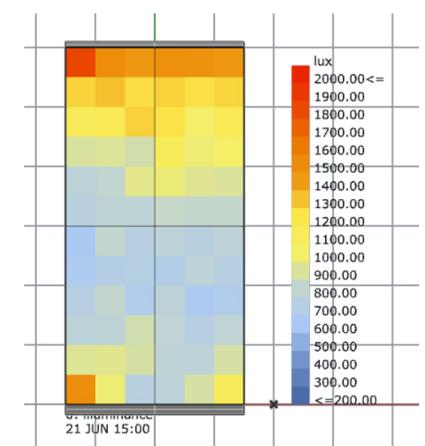
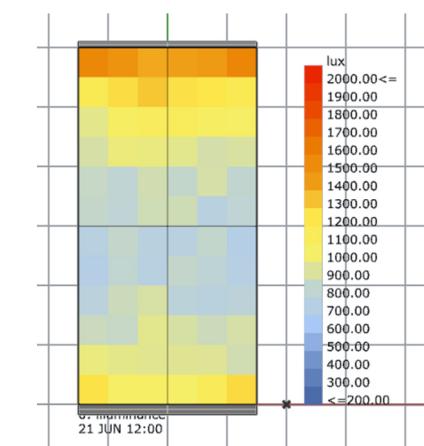
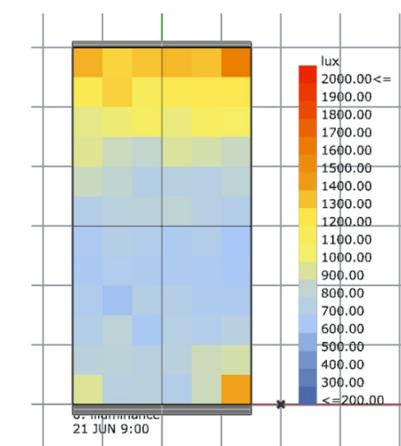
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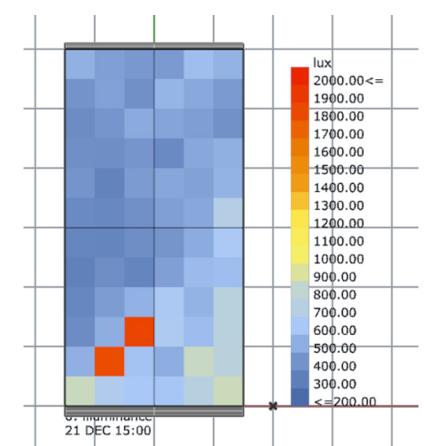
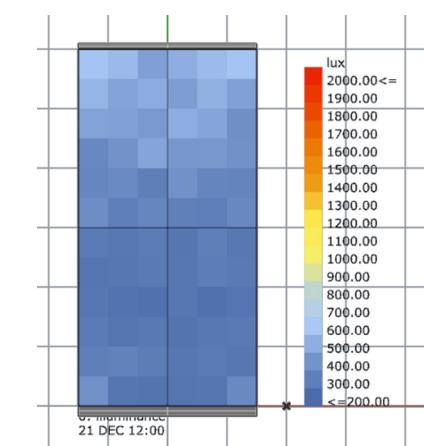
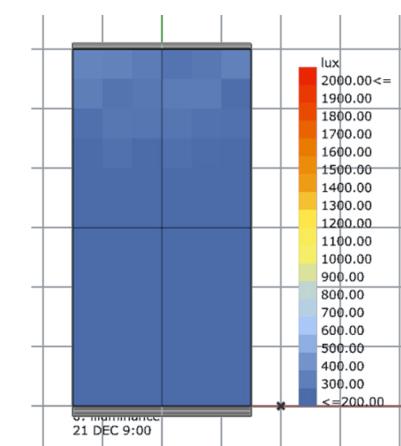
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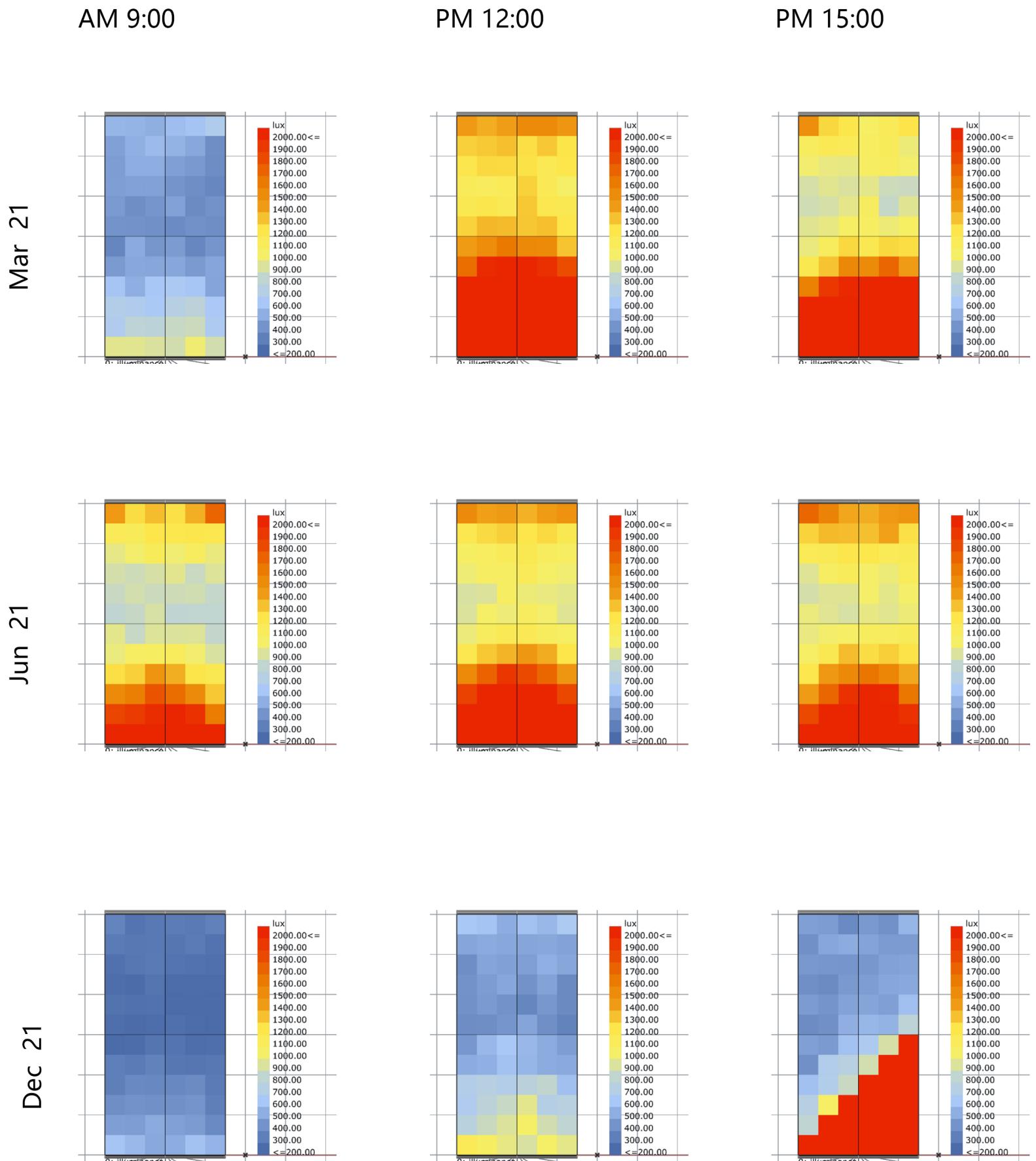
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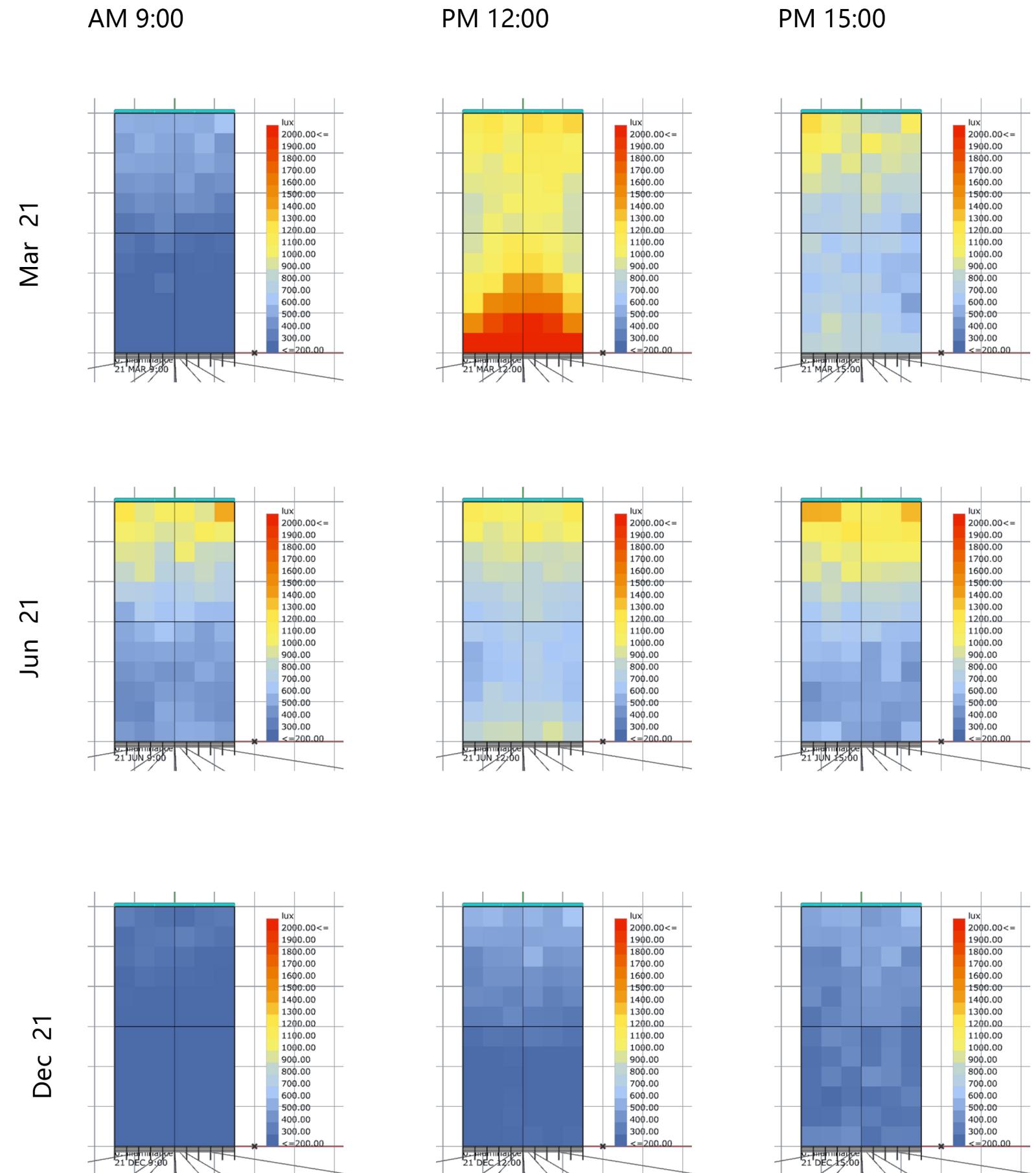
Dec 21



DESIGN PROCESS



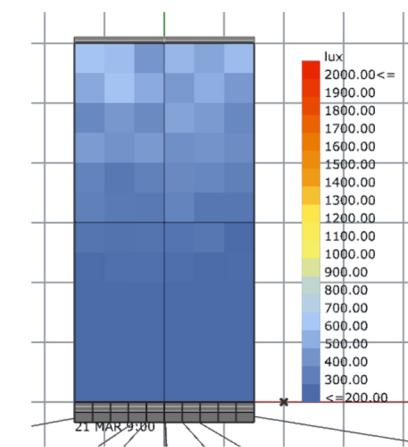
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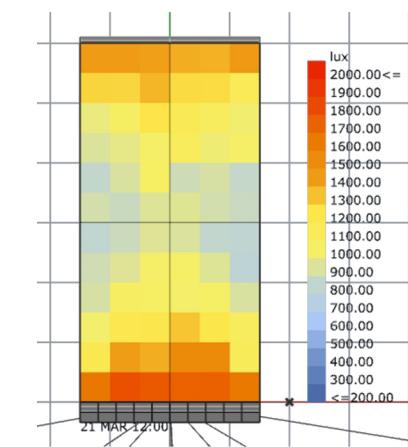
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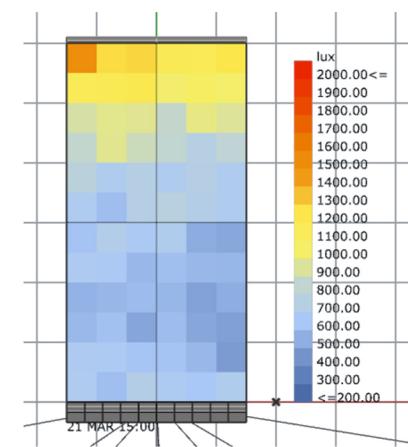
Mar 21



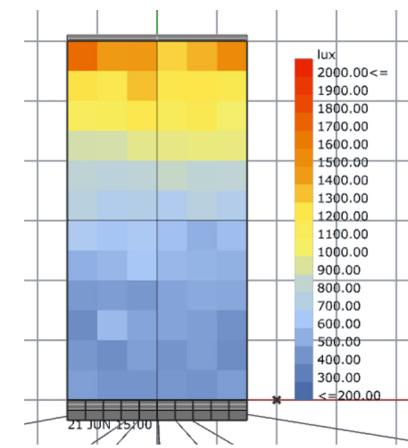
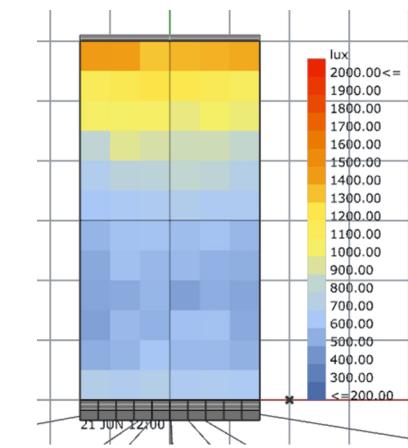
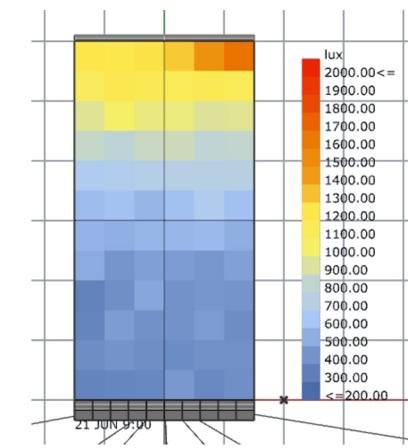
PM 12:00



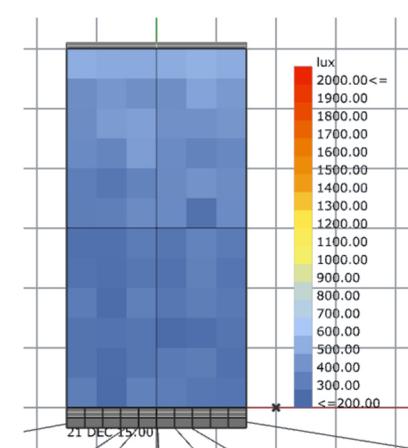
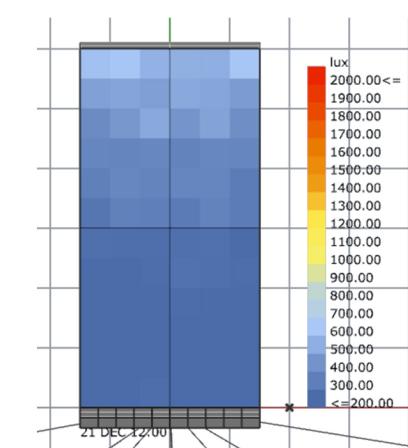
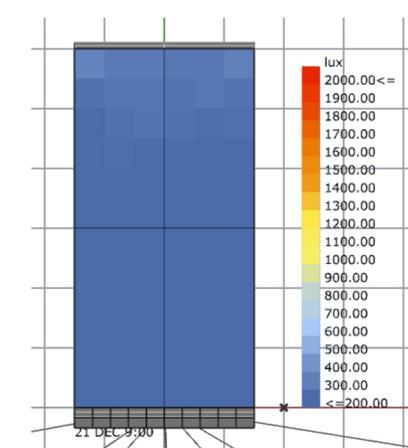
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Jun 21

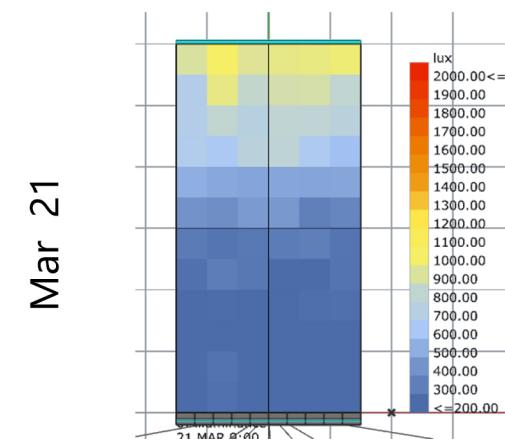


Dec 21

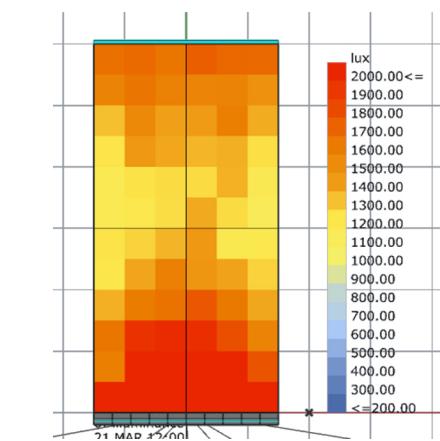


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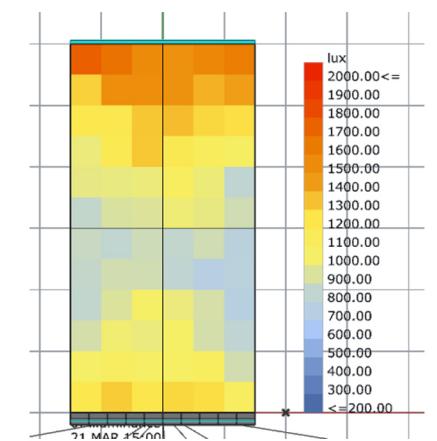
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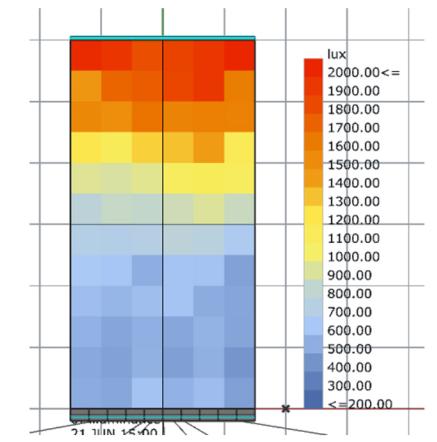
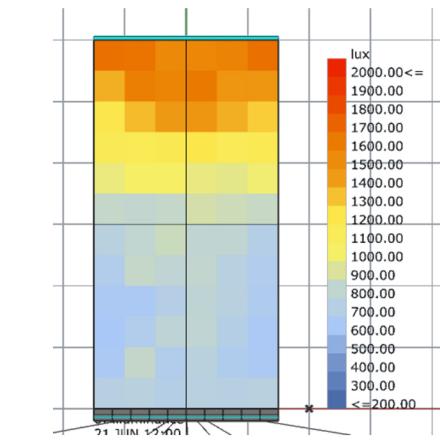
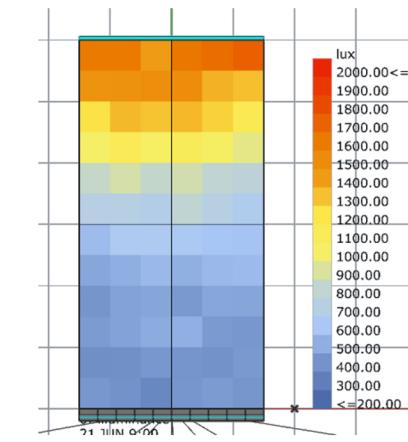
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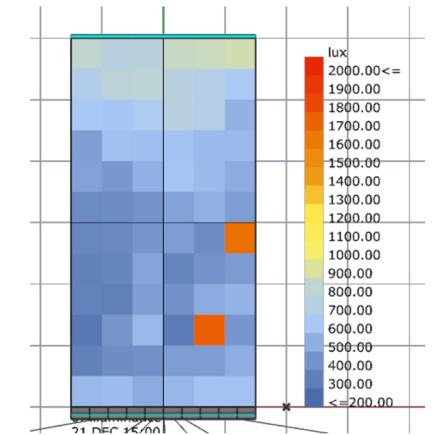
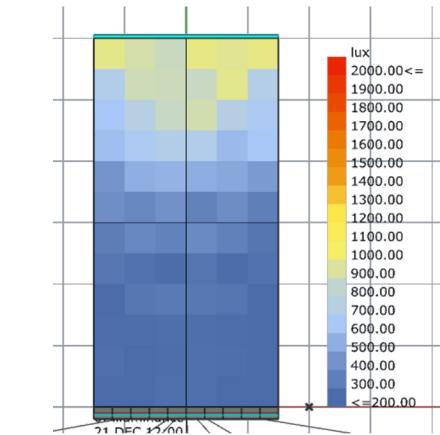
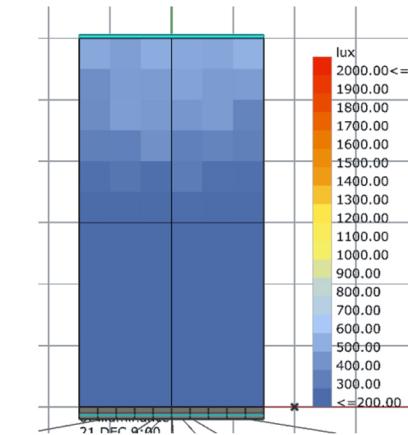
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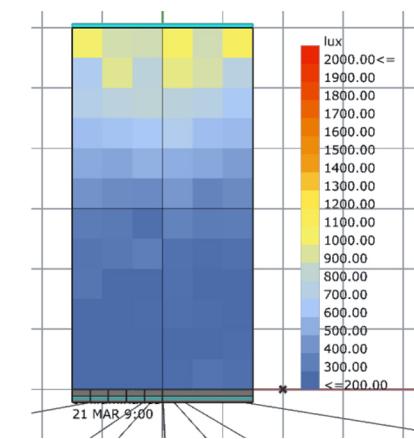
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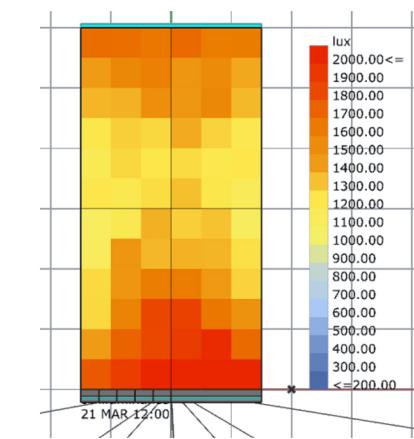
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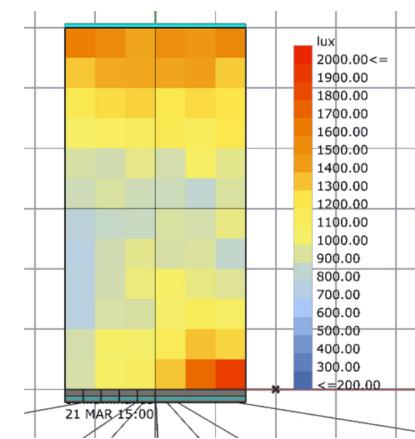
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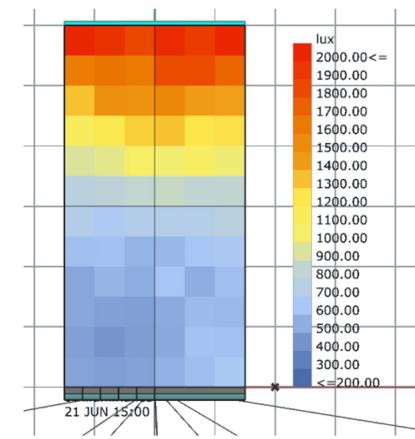
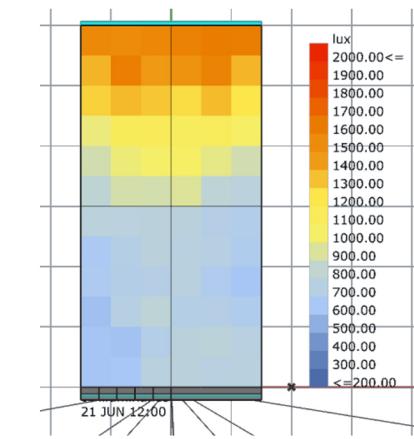
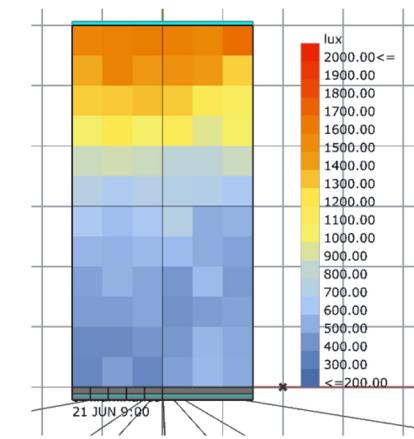
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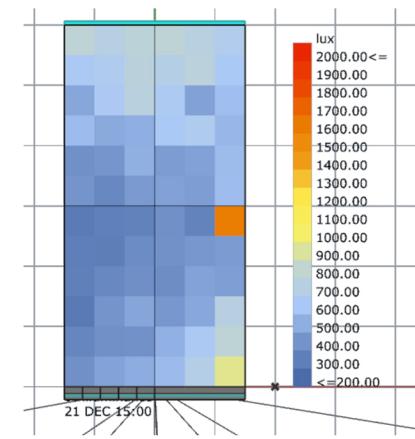
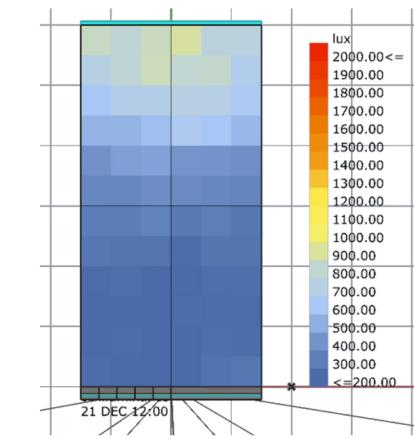
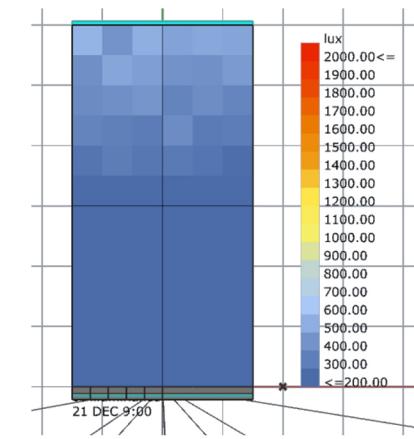
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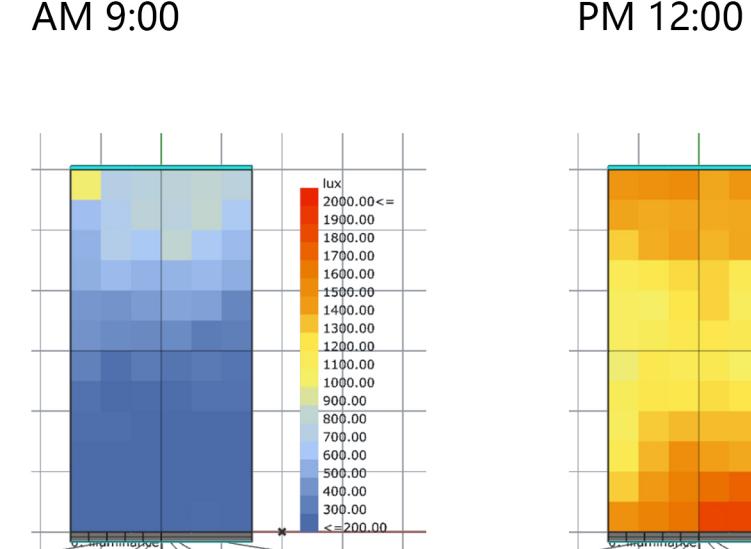
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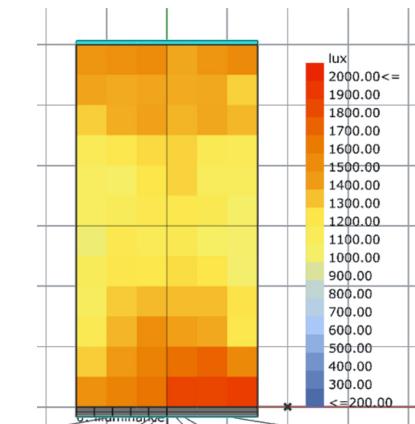
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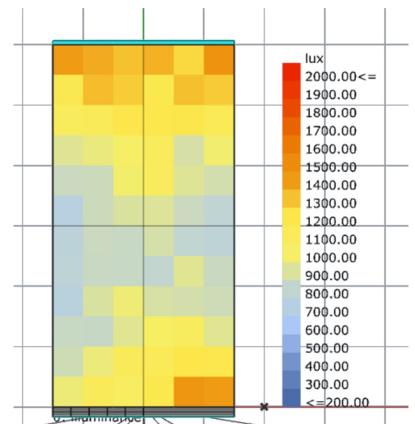
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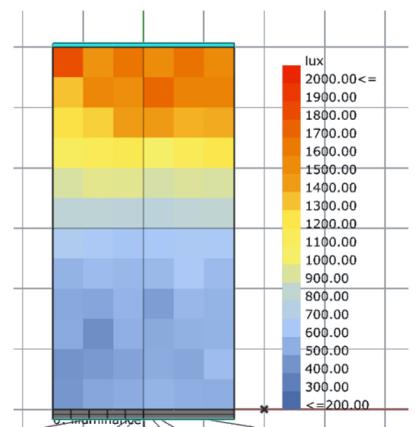
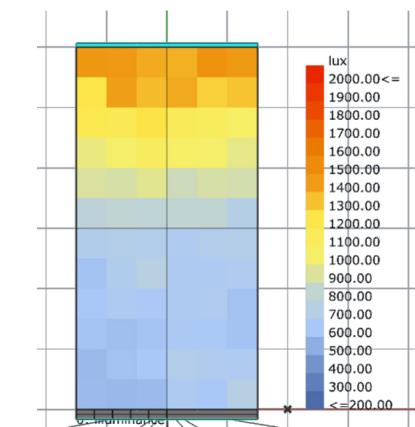
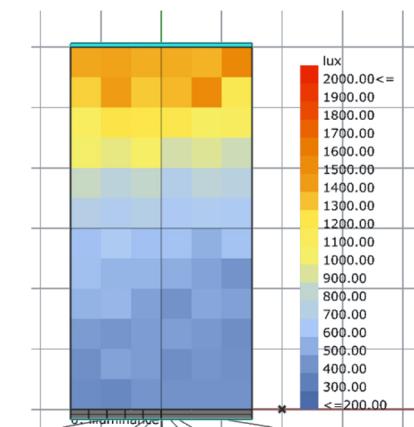
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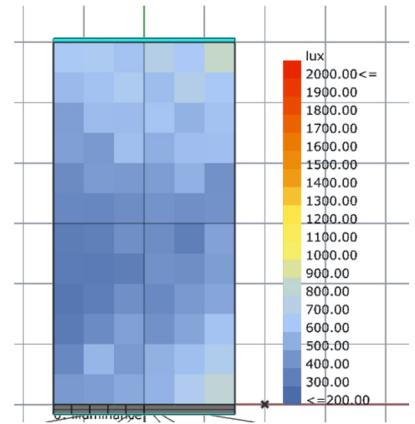
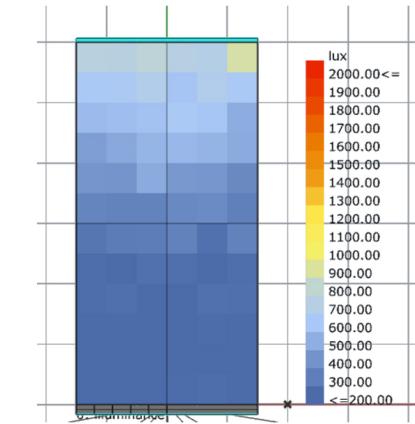
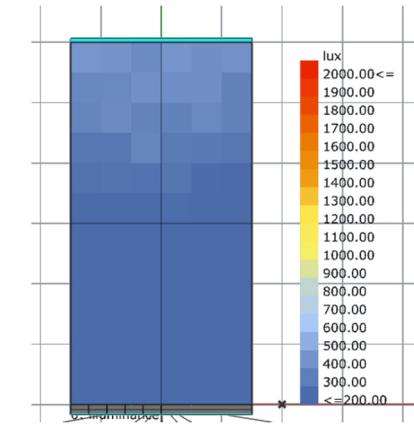
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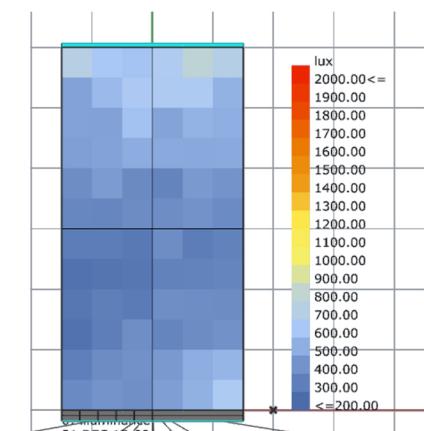
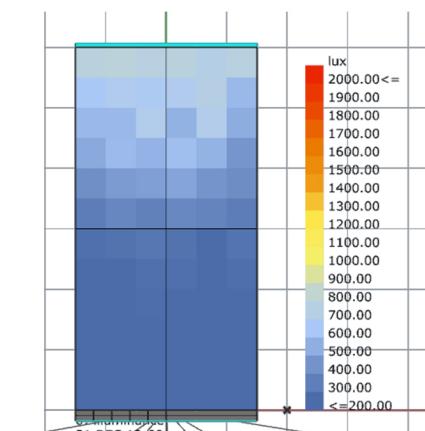
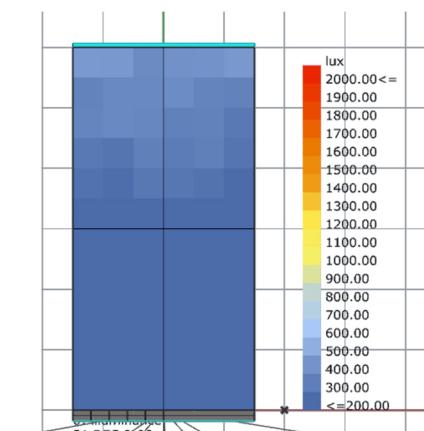
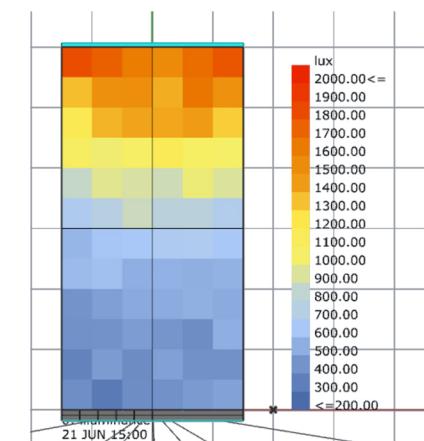
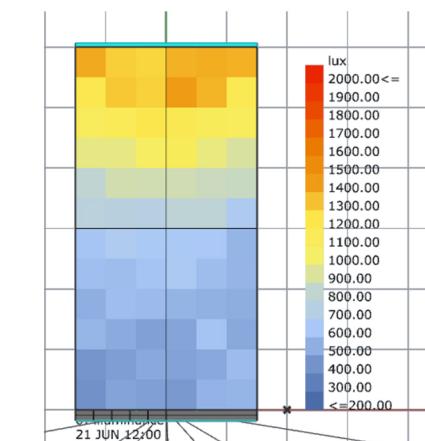
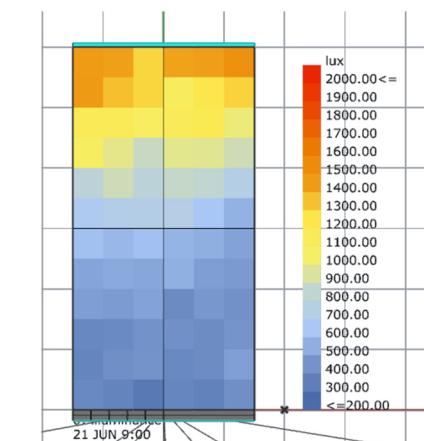
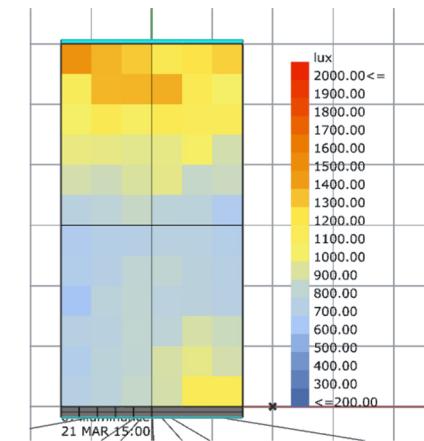
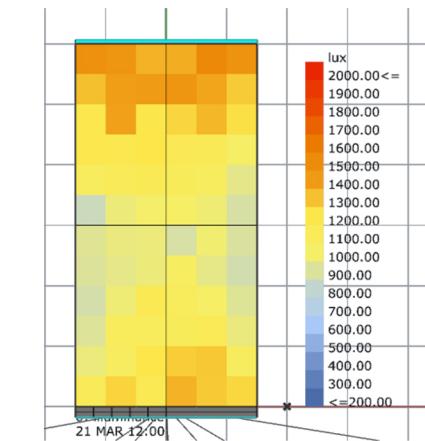
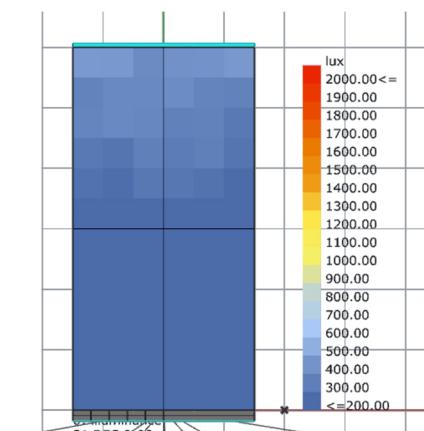
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