

Controllable Lighting Model for Designing Digital Panorama Maps in the Style of Novat

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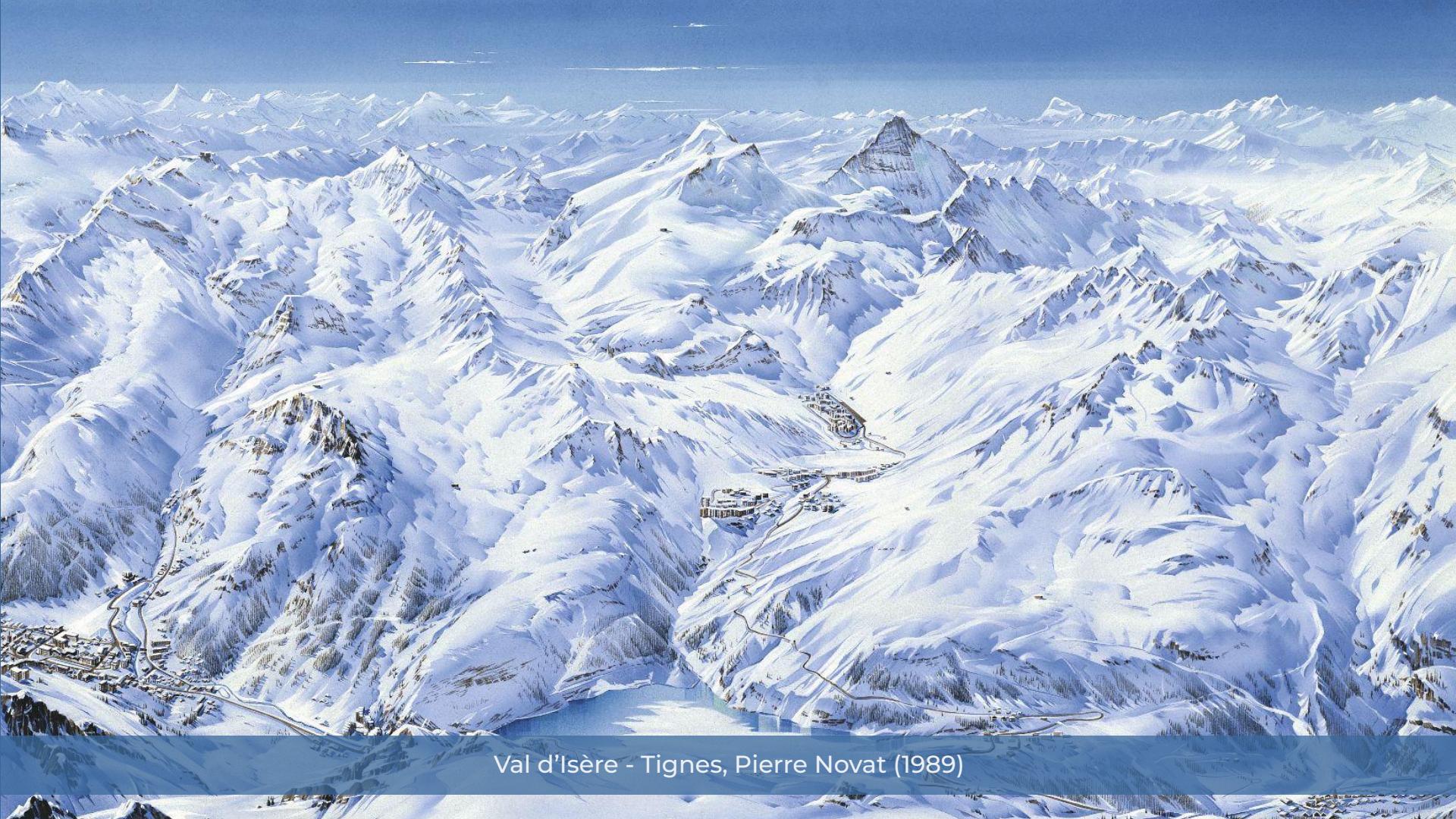
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²Atelier Novat

ICA 12th Mountain Cartography Workshop
Snow Mountain Ranch, Colorado

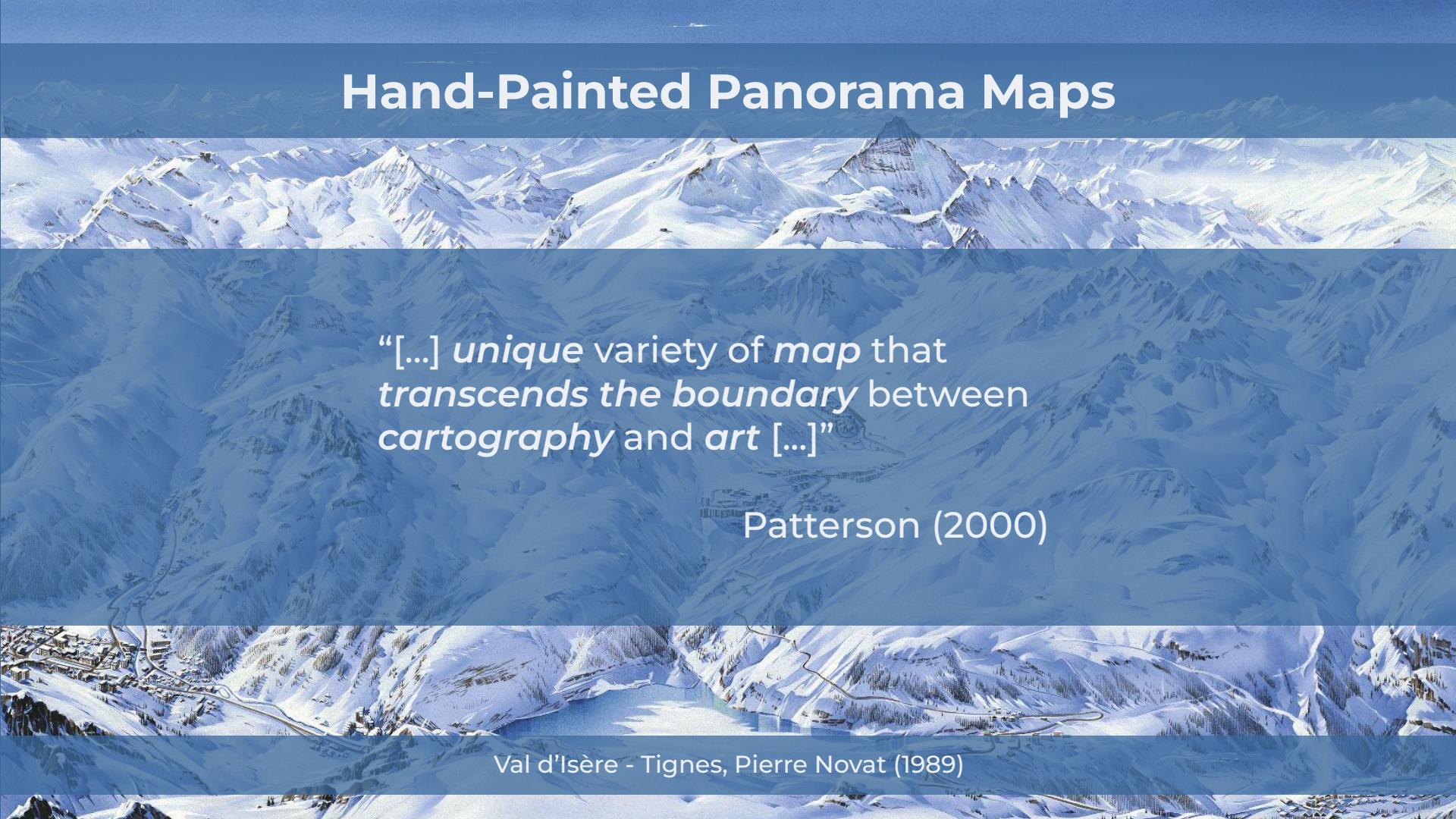
April 11-15, 2023





Val d'Isère - Tignes, Pierre Novat (1989)

Hand-Painted Panorama Maps



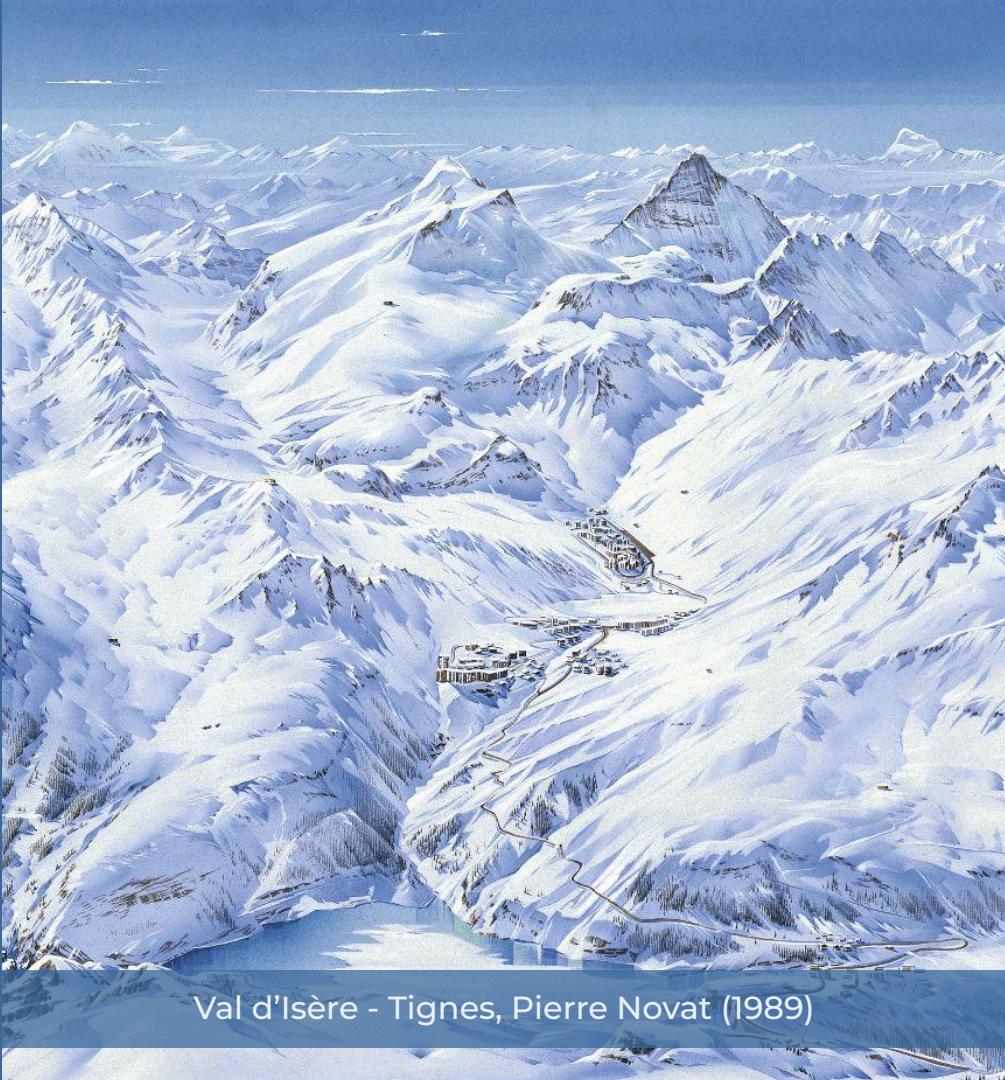
“[...] unique variety of *map* that
transcends the *boundary* between
cartography and *art* [...]”

Patterson (2000)

Val d'Isère - Tignes, Pierre Novat (1989)

Advantages

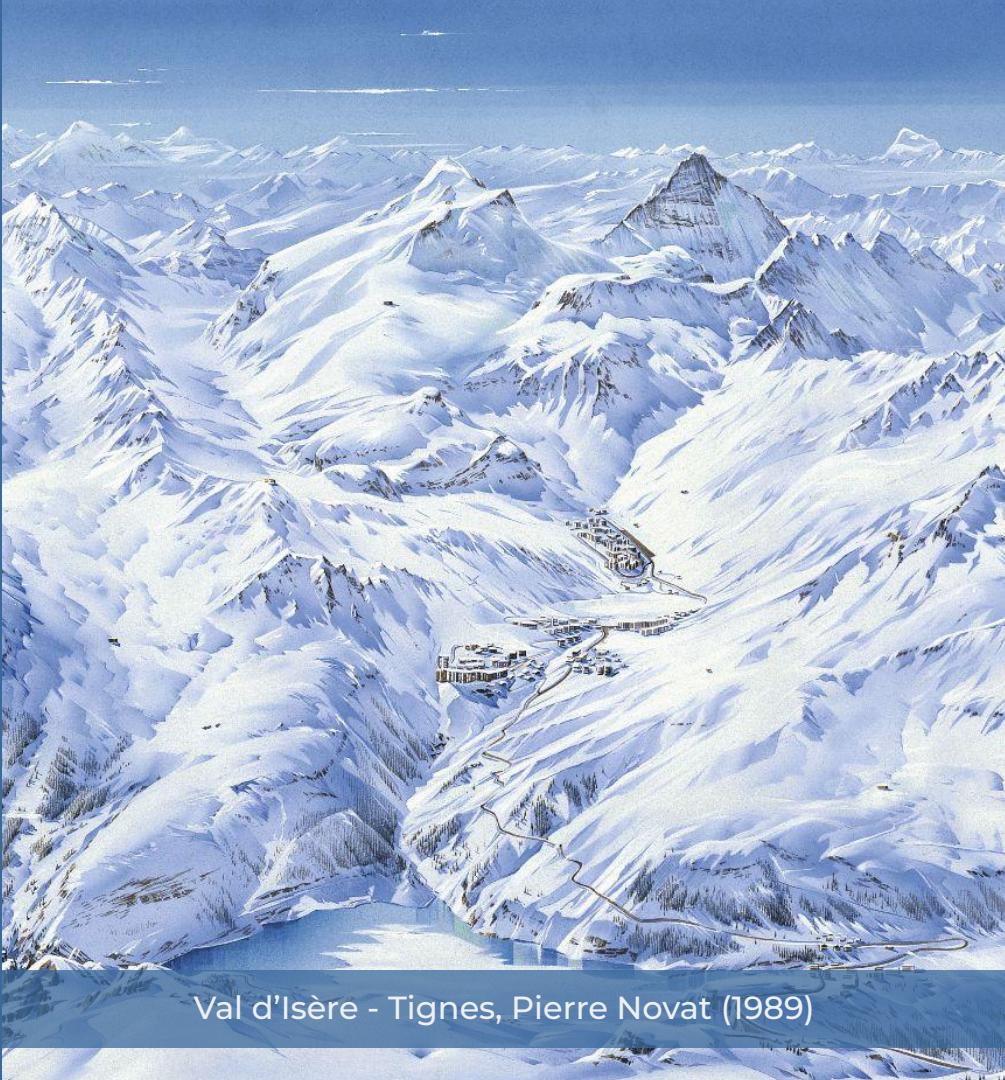
- + Effective depiction of relief
- + Aesthetic
- + Standard (Tait 2010)



Val d'Isère - Tignes, Pierre Novat (1989)

Drawbacks

- Difficult
- Time-consuming
- Few experts worldwide



Val d'Isère - Tignes, Pierre Novat (1989)

Atelier Novat

Stylistic study (Mestres 2022)

Appears *realistic*



Val d'Isère - Tignes, Pierre Novat (1989)

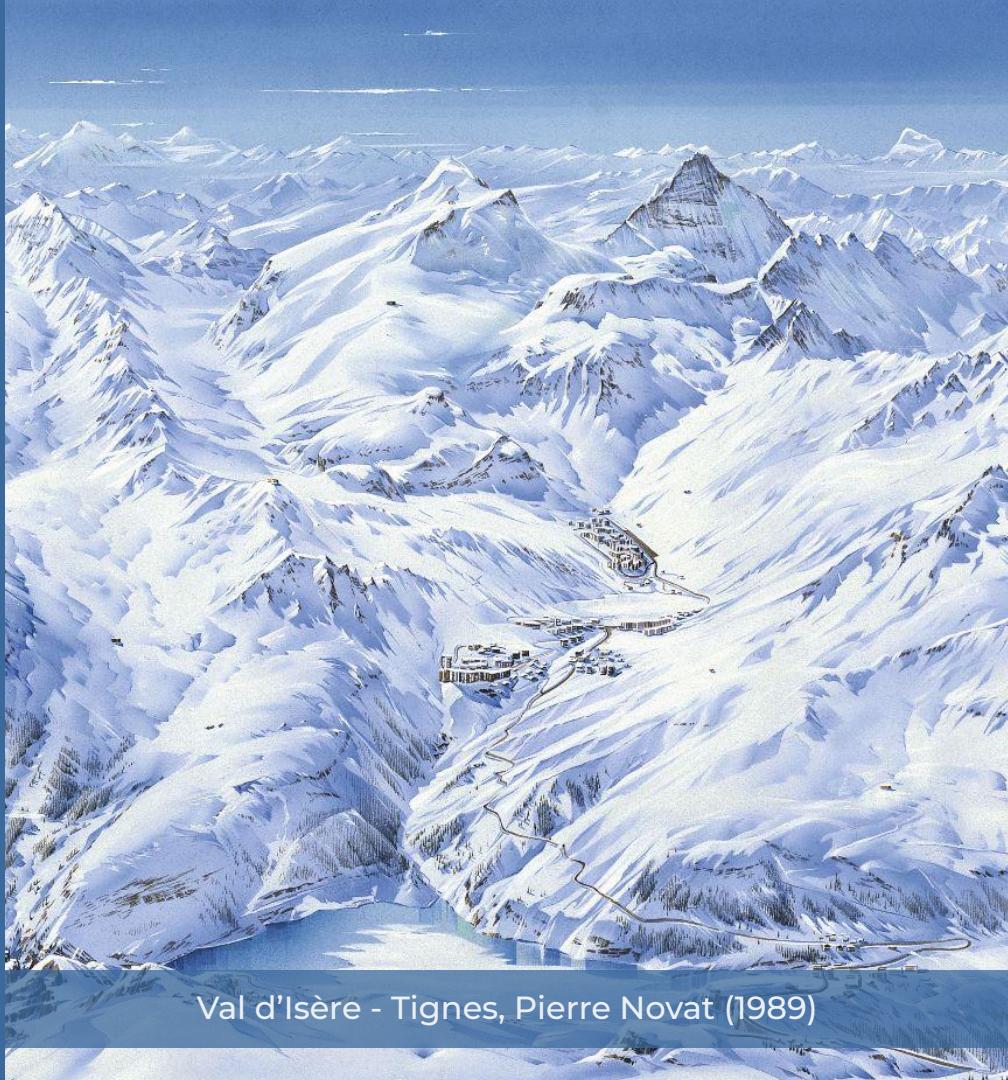
Atelier Novat

Stylistic study (Mestres 2022)

Appears *realistic*

Tricks to enhance *shape* and
depth depiction

Inconsistent illumination



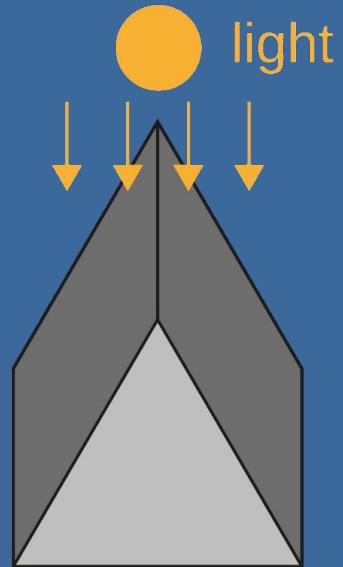
Val d'Isère - Tignes, Pierre Novat (1989)

How to do it with a computer?

Key ideas

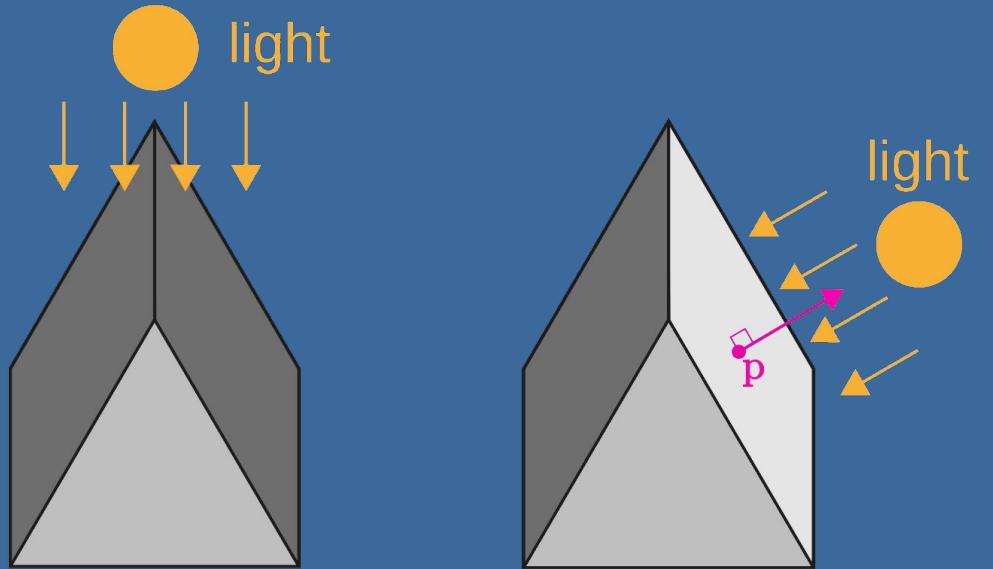
- *Different light directions for shading and cast shadows*
- Function of *terrain geometry* (local variations)

Shading



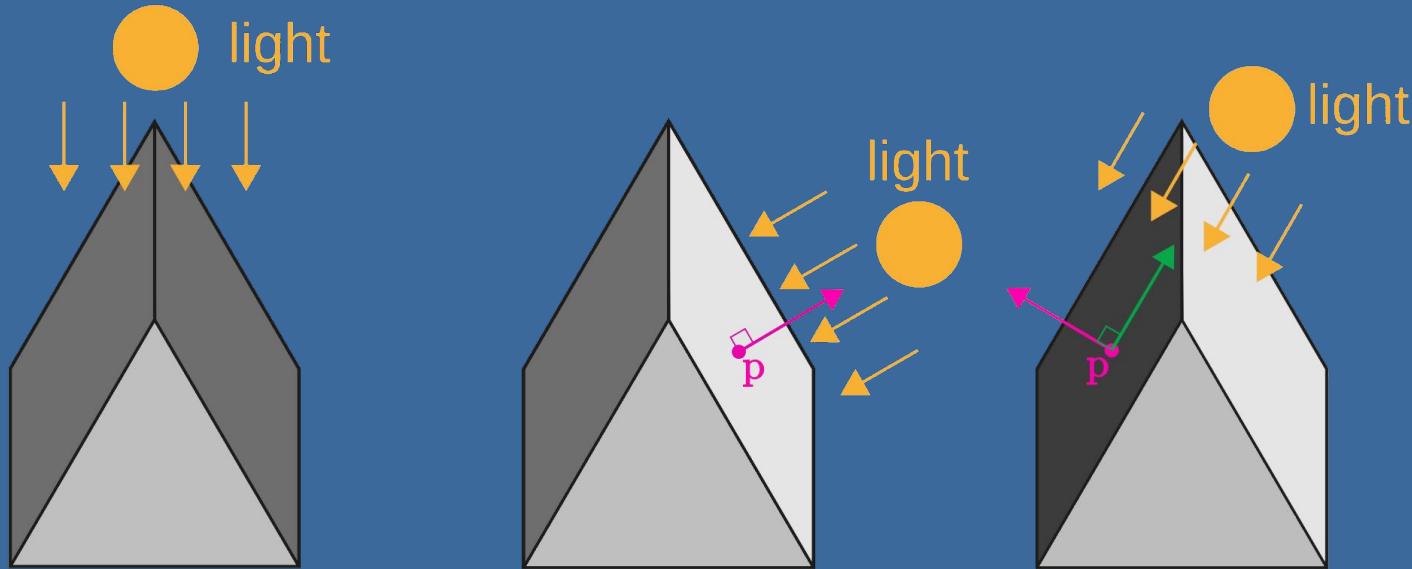
Local Light Alignment for Multi-Scale Shape Depiction (Mestres et al. 2021)

Shading



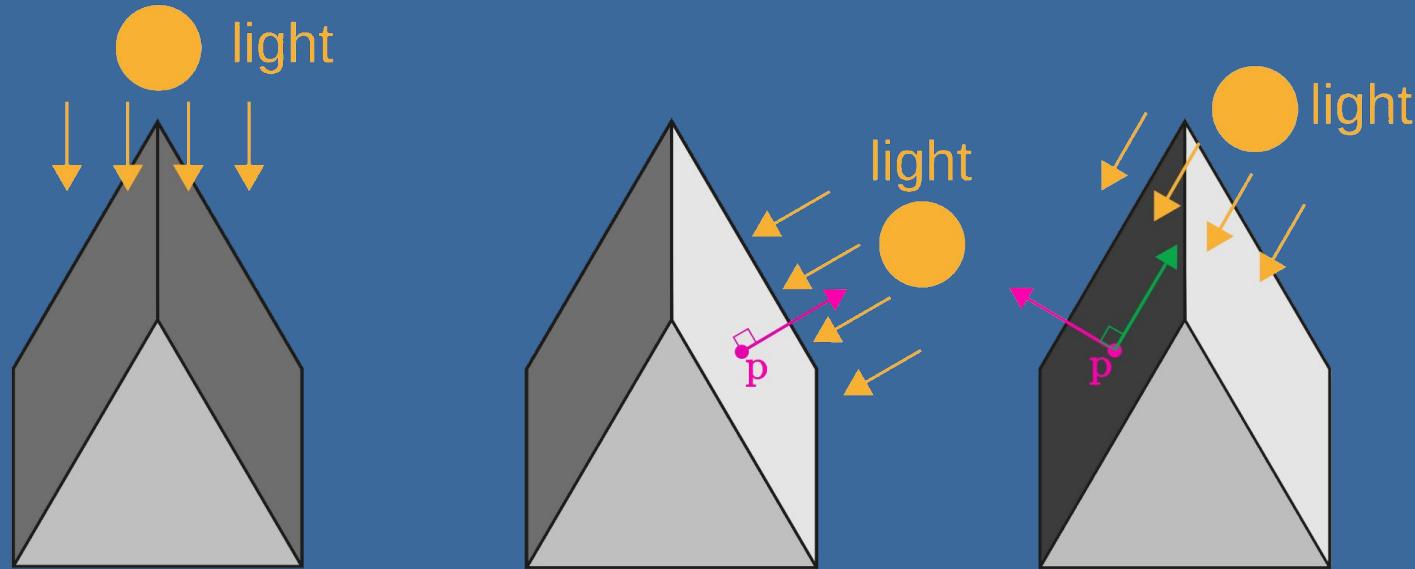
Local Light Alignment for Multi-Scale Shape Depiction (Mestres et al. 2021)

Shading



Local Light Alignment for Multi-Scale Shape Depiction (Mestres et al. 2021)

Shading



Local Light Alignment for Multi-Scale Shape Depiction (Mestres et al. 2021)

Maximum contrast, aligned with geometry → shape depiction

Shading



Lambertian shading

Shading

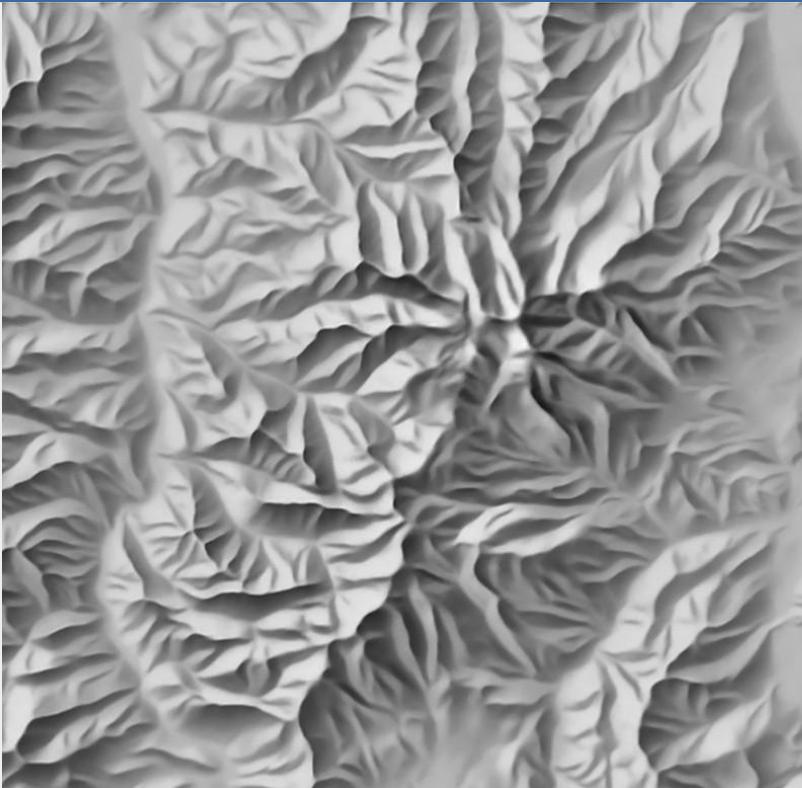


Our enhancement

Shading

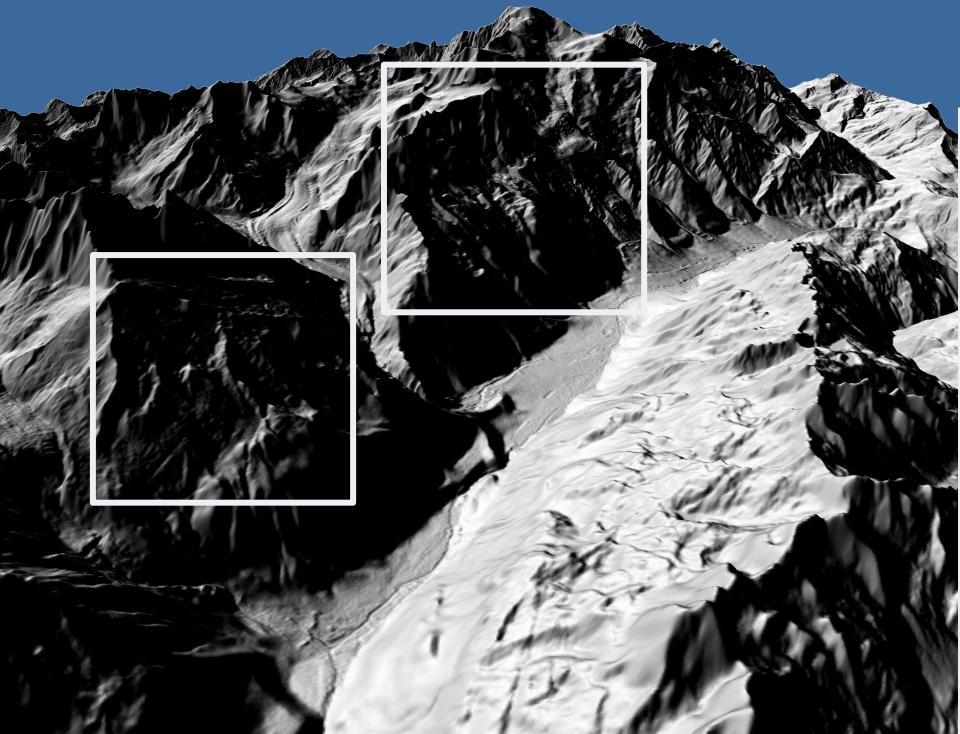


Our enhancement

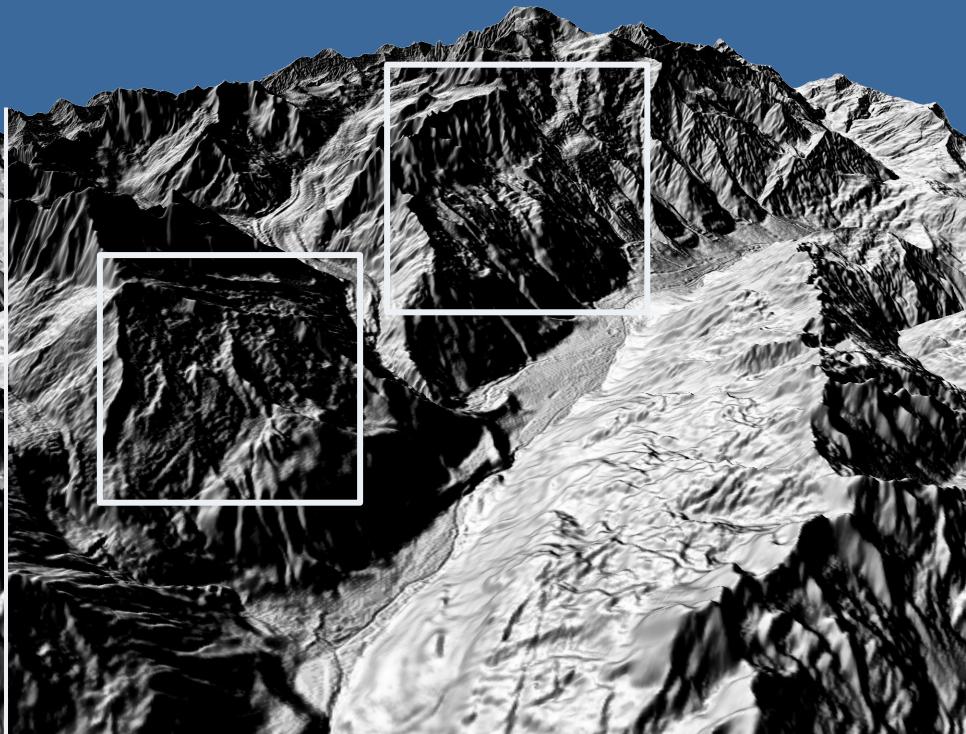


Jenny et al. (2022)

Shading



Lambertian shading

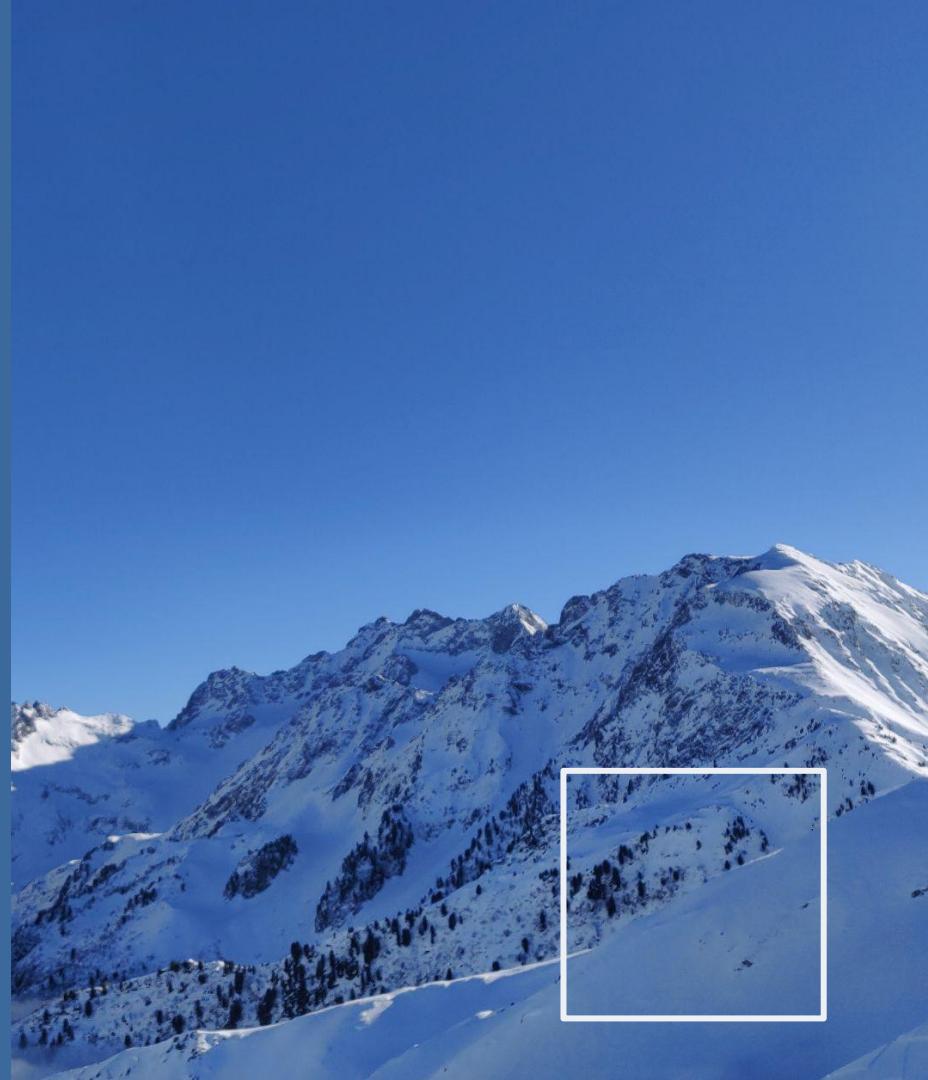


Our enhancement

Cast Shadows

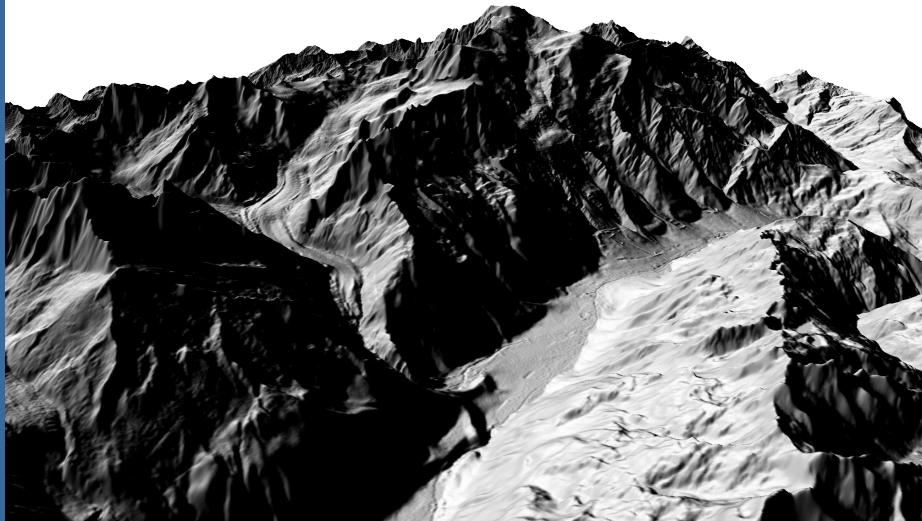
Ambivalent:

- Adverse impact on vision
→ *masking*
- + Necessary to *perceive depth*



Cast Shadows

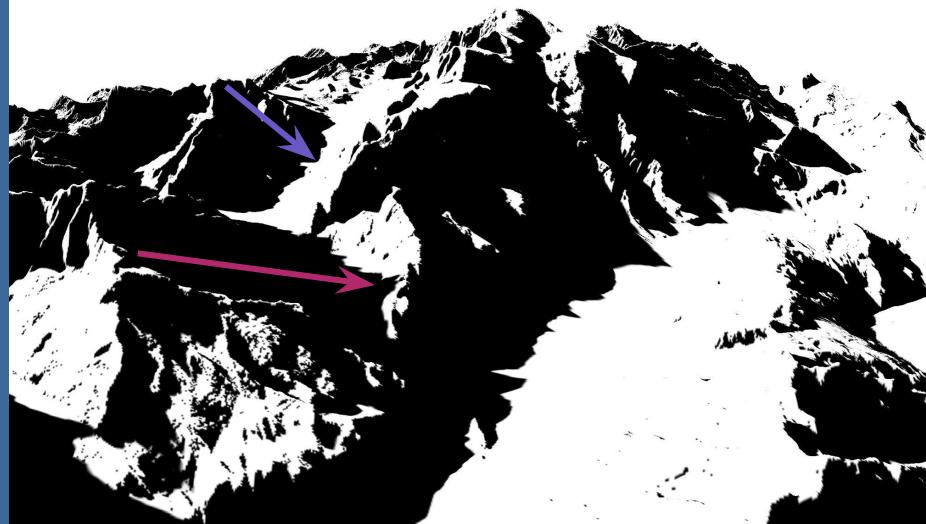
Single light direction?



Cast Shadows

Multiple light directions

Control the length of cast shadows





Shading and shadowing combined



Inspiration (Chamonix, Novat 84)



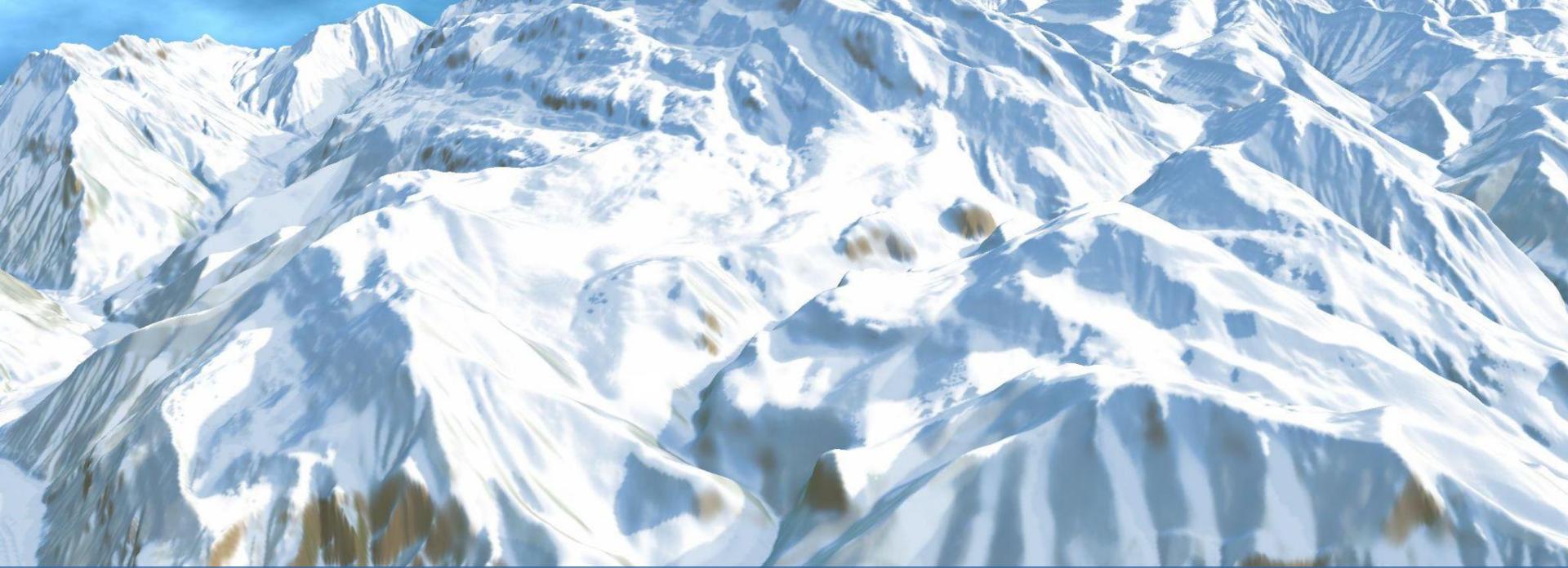
Chamonix, with our lighting



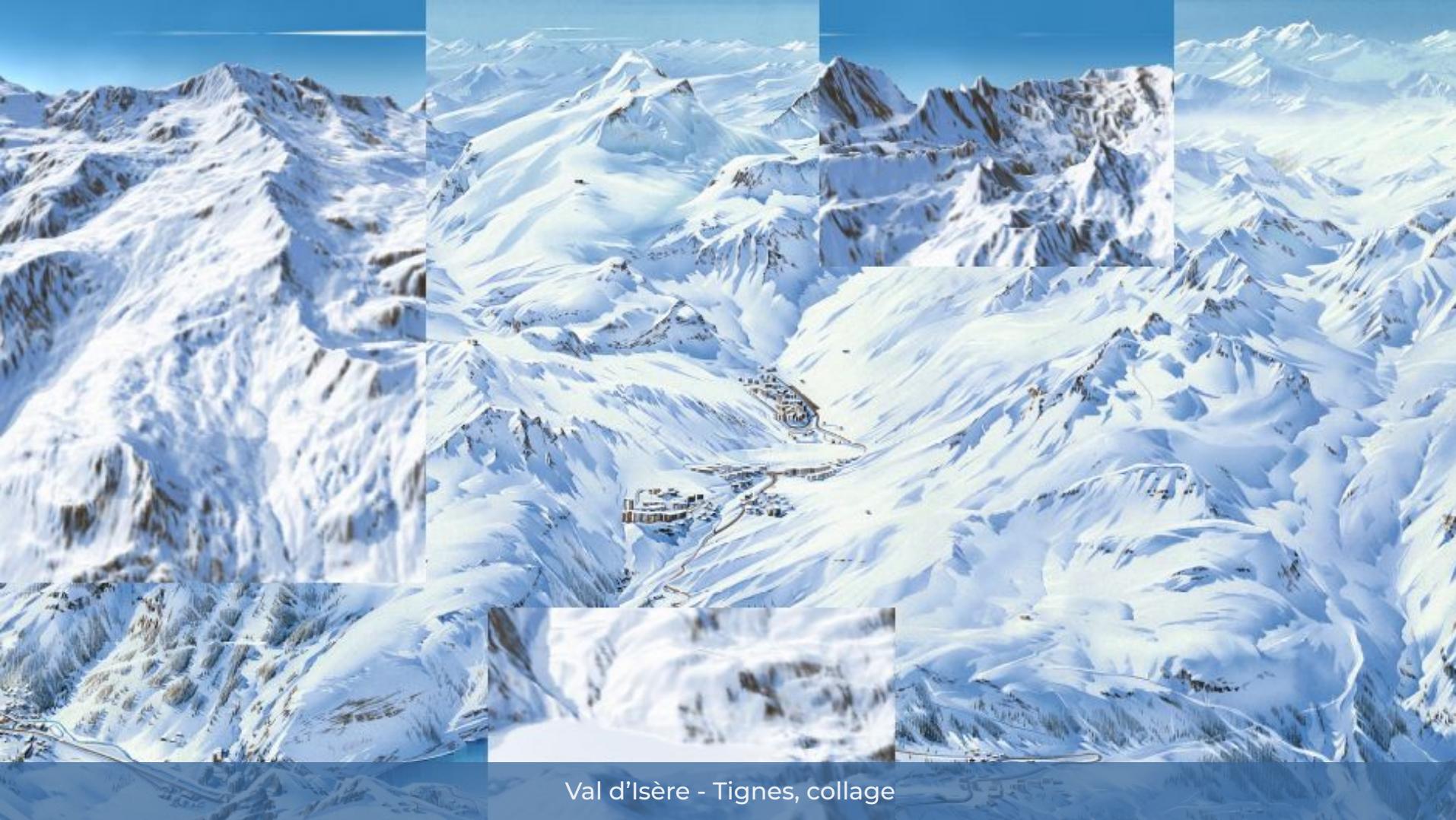
Inspiration (Huez, Novat 89)



Alpe d'Huez, without enhancement



Alpe d'Huez, with our lighting



Val d'Isère - Tignes, collage



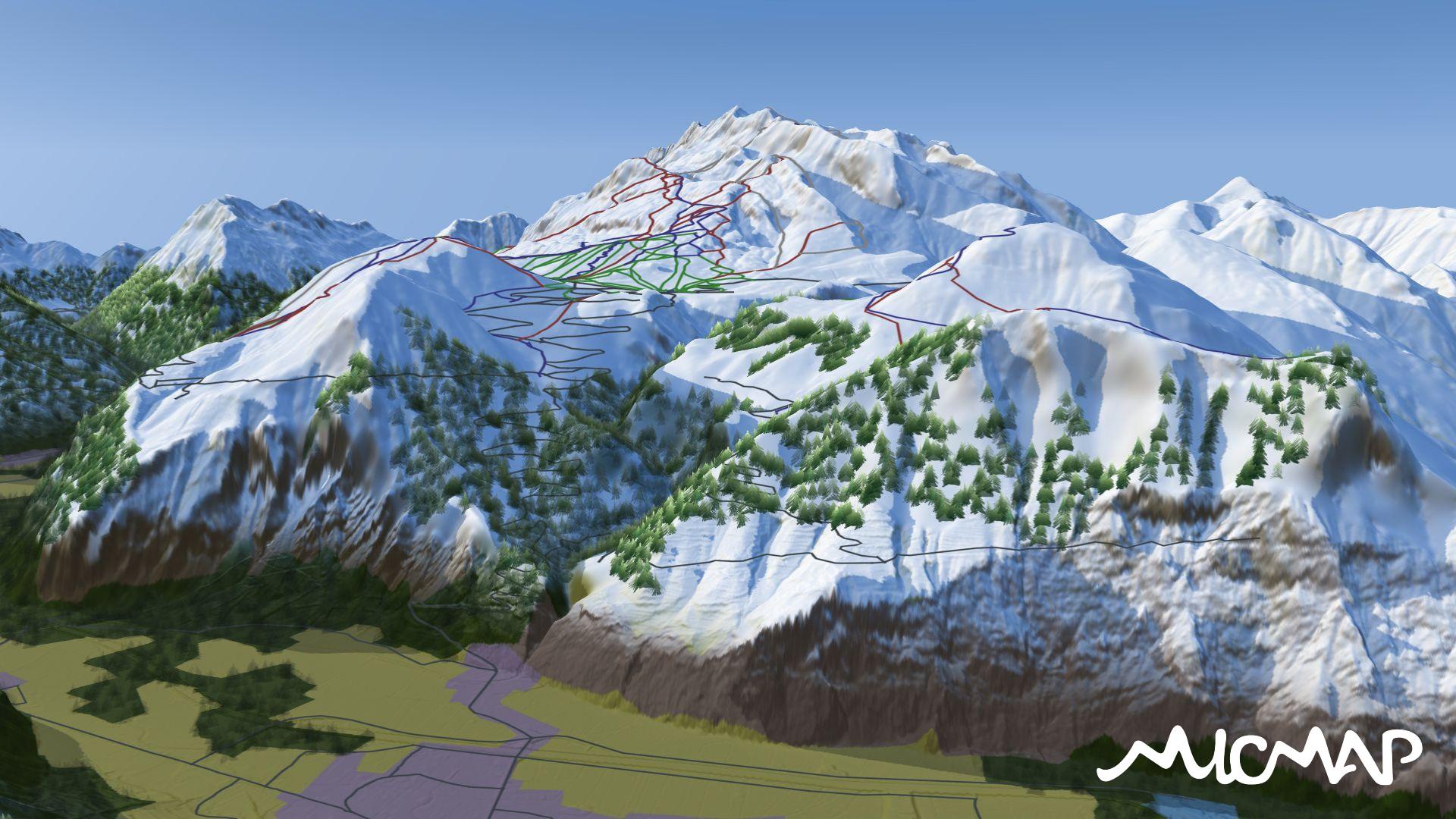
Future Works

Missing cartographic elements:

- Roads, trails, ski tracks
- Forests, rocks
- Rivers, lakes
- Buildings



Deform terrain geometry



MOMAP

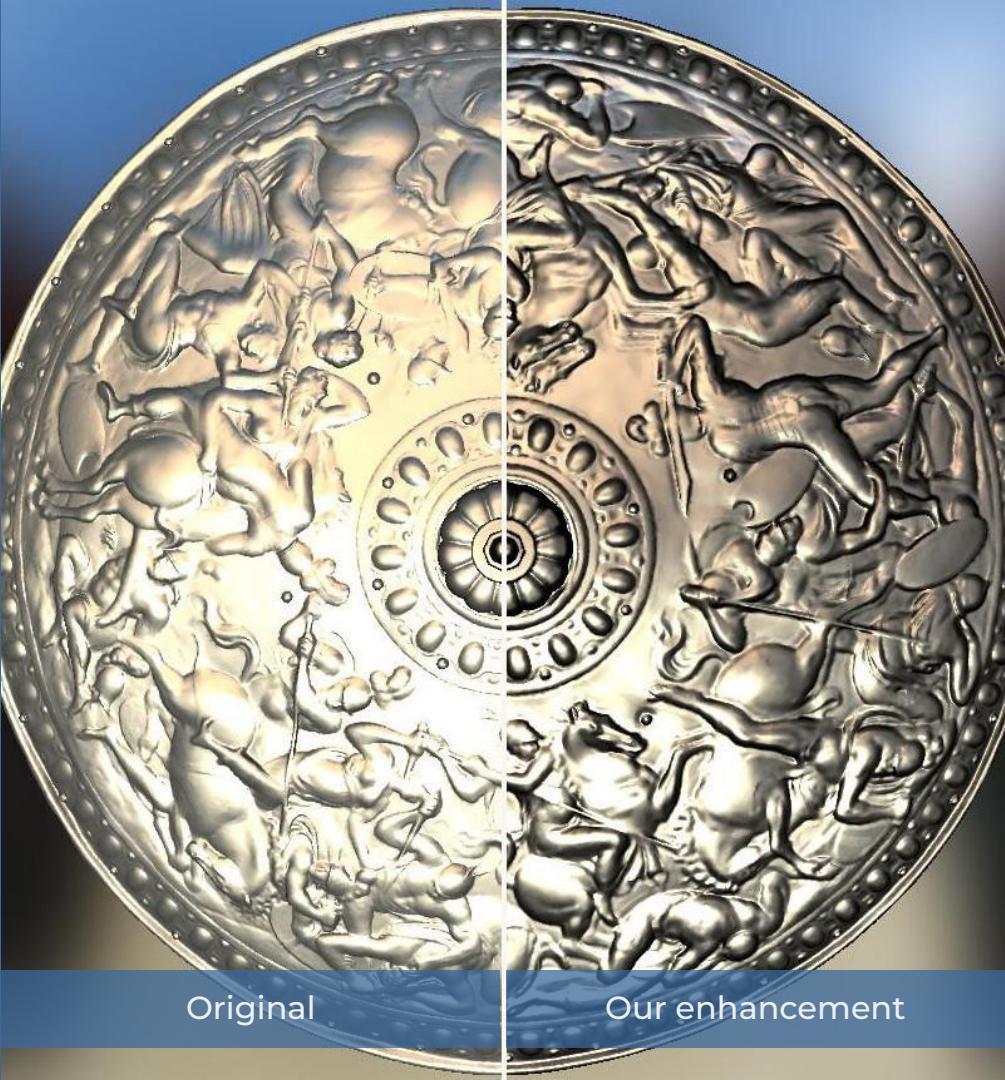


Thank you!

MOMAP

Shading

Local Light Alignment for
Multi-Scale Shape Depiction
(Mestres et al. 2021)



Original

Our enhancement