

The image shows a first-person view from inside a blue, swirling tunnel, possibly a water slide. The walls of the tunnel are made of a material that looks like ice or a very smooth, wet surface, with visible water droplets and a shimmering effect. The water is a vibrant blue, and the overall atmosphere is dynamic and refreshing. The text "ICE LODGE" is centered in the middle of the image in a large, white, sans-serif font.

ICE LODGE

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EVALUATION AND OUTLOOK

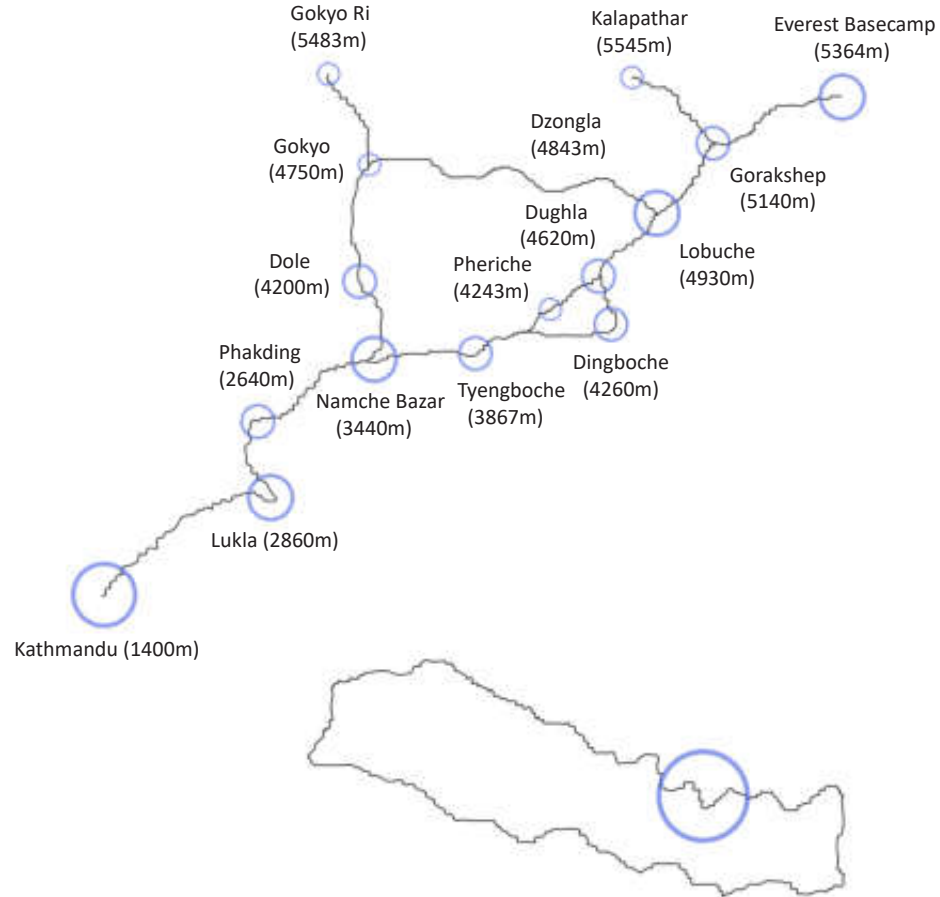
INTRODUCTION



SITUATION ANALYSIS



Mount Everest Basecamp Trek Route Map









Phakding
(2640m)

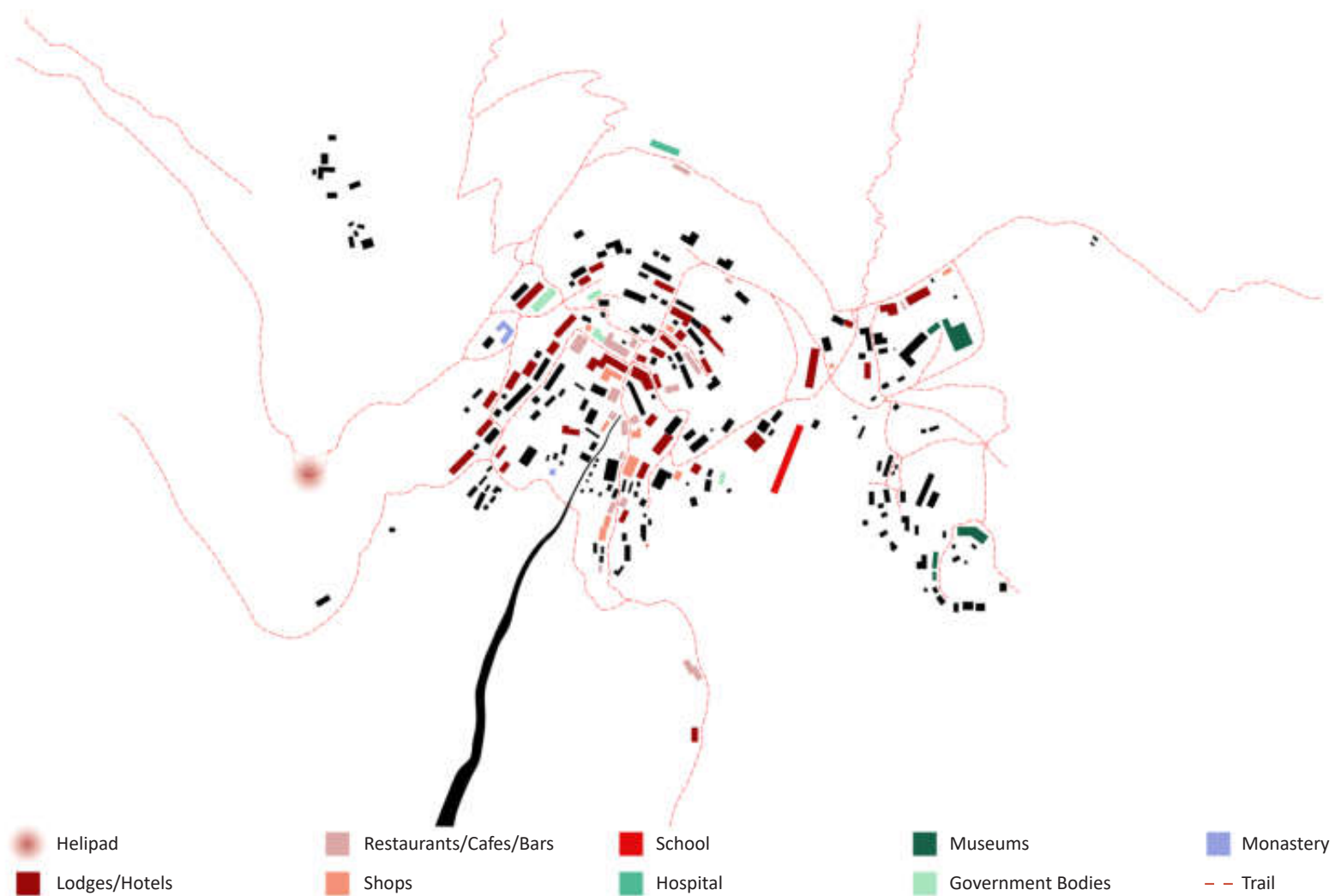








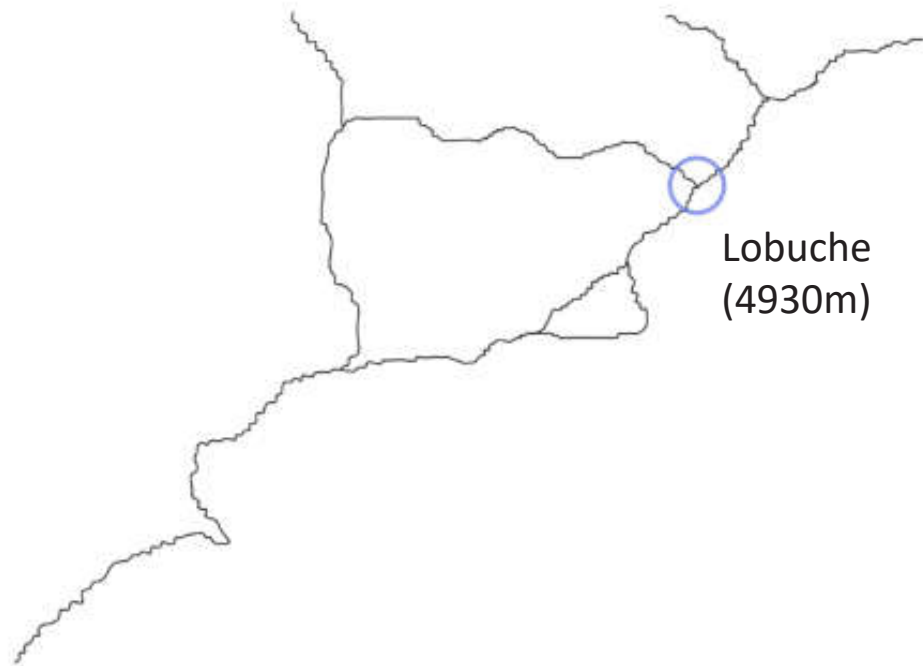
Site Plan





Dingboche
(4260m)





Lobuche
(4930m)







Everest Basecamp
(5364m)











Interview

16.06.2022

The conversation with Ang was not recorded and therefore analogously reconstructed.

Teresa:

What do you think are the main problems in Lodges?

Ang:

Lodges usually have heating problems and rely on solar energy. In general, they depend a lot on the climate and the different seasons. Also, often there's no electricity due to heavy snowfall or storms.

Teresa:

How could the social aspect of Lodges and the Mount Everest Basecamp get improved?

Ang:

The porters can't effort the tourist prices, they have to save money. For them, climbing to the Basecamp is work and not a holiday. Maybe a universal Lodge could lead to more social equality and connect people.

Teresa:

Do you think there's a need for making the Lodges more luxurious?

Ang:

Locals, as well as tourists, want to keep it traditional, to live and experience authenticity. The demand at the Basecamp is high and it's very crowded during the peak seasons. So there's a limited possibility and not too much request for luxury.

Teresa:

What are your thoughts about a Lodge at the Basecamp?

Ang:

The Government won't permit building a permanent Lodge at the Basecamp. The moving Khumbu Glacier makes it hard to construct something permanent. A seasonal temporary structure could be suitable.

Teresa:

How do professional mountaineers, who are summiting Everest, use Lodges?

Ang:

In general, Climbers, Porters and Locals are using the Lodges. Climbers, who want to summit Everest, are flying directly to the Basecamp, stay there for 2-3 weeks, and then climb to the peak.

Teresa:

How do you think Lodges could be more sustainable?

Ang:

Instead of gas and kerosene, we should use eco-friendly electricity. Using more sustainable materials could be an approach. Also, very important is waste management. Together with the Nepali Government, we have this project called 'Mountain Cleaning' where we collected 33 tons of trash from the mountains. I think after enhancing the logistics, also waste management will be improved.

Teresa:

Do you think the climbing permit for Everest should be higher/lower?

Ang:

The climbing permit for Everest costs 11000\$. Right now the Government is thinking about changing it to 15000\$. The permit for the other 8000m mountains is only 1800\$. In my opinion, the current permit amount is reasonable. Decreasing it would be a bad solution, it's better to limit the number of climbers per season.

Teresa:

How do you think the Trekking Industry at the Mount Everest Basecamp will develop in the future?

Ang:

The number of climbers is increasing every year, as well as the demand for Porters, Lodges, etc. A higher number of tourists is good for Nepal because Tourism is the main income here. That way, we can invest in new roads, Lodges, and Sustainability.



Ang Babu Sherpa

Managing Director
Climber

Mount Pumori

Basecamp

Khumbu Icefall

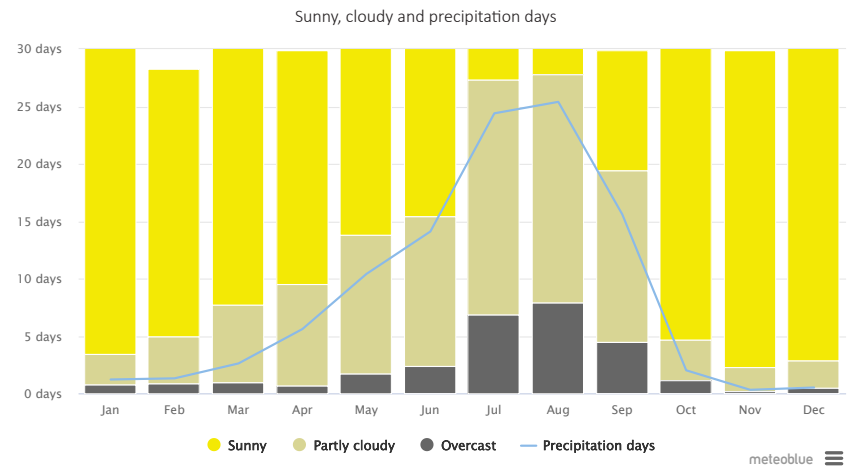
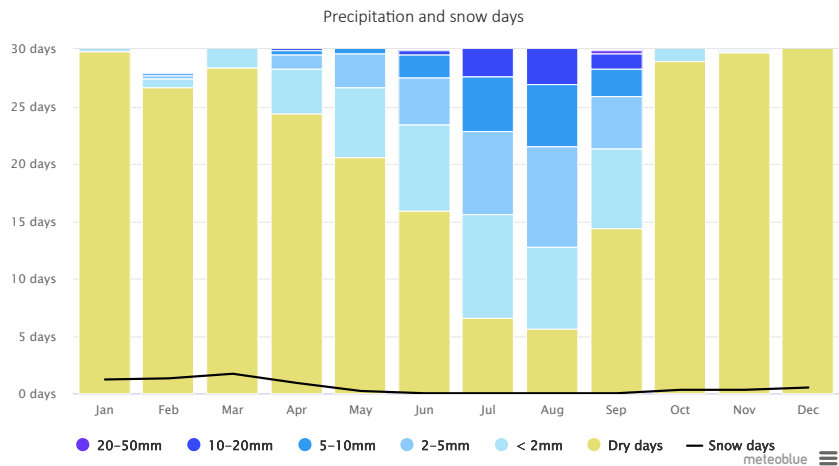
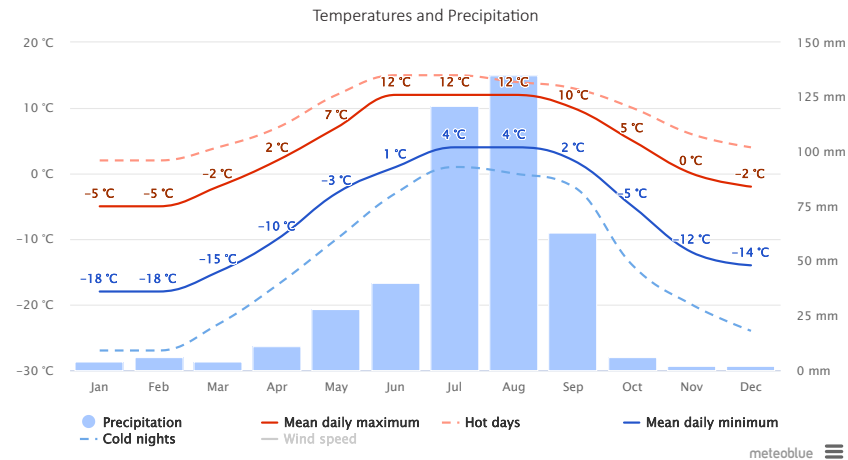
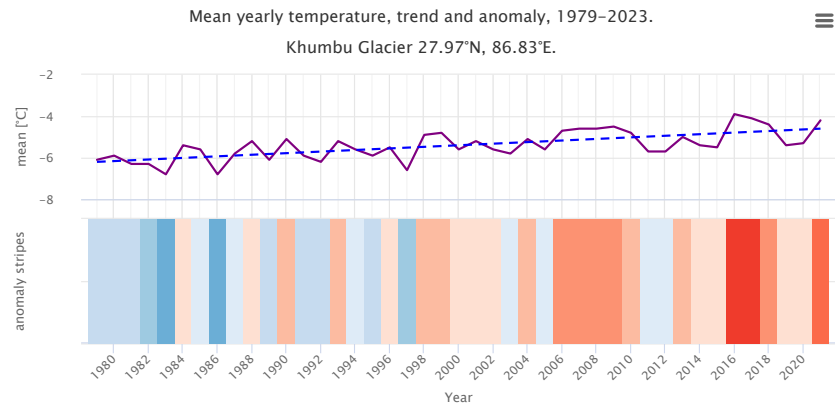


Kalapathar

Glacier Lake

Khumbu Glacier

Everest Camp I





Inuit October 1909



Igloo



Harbin Ice and Snow World



Harbin Ice and Snow World Interior

OBJECTIVES

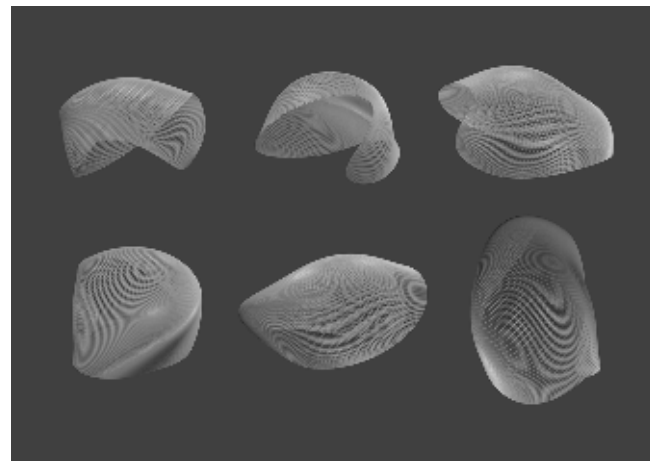
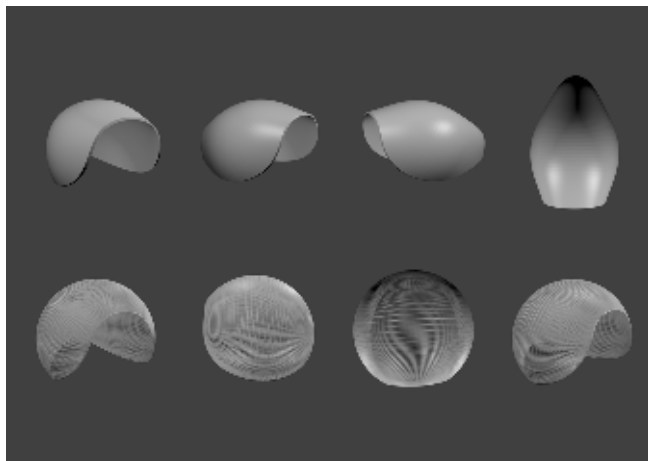
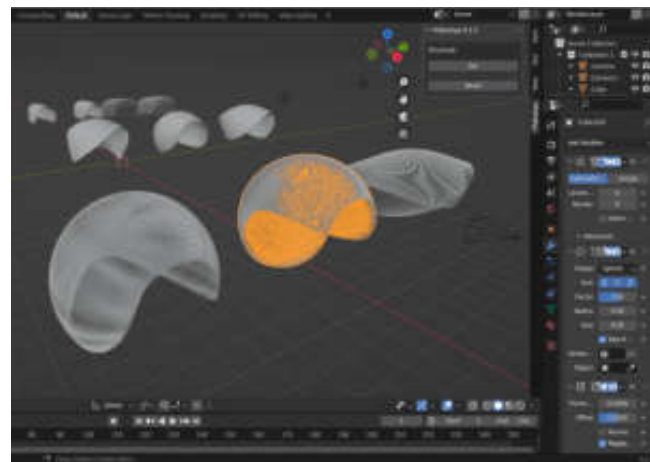
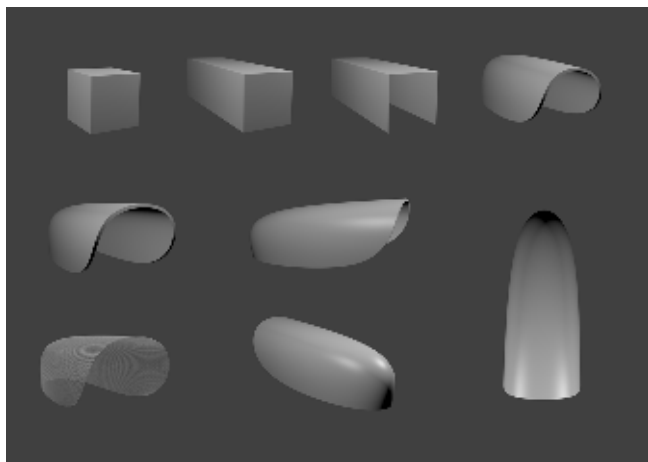


METHODOLOGY

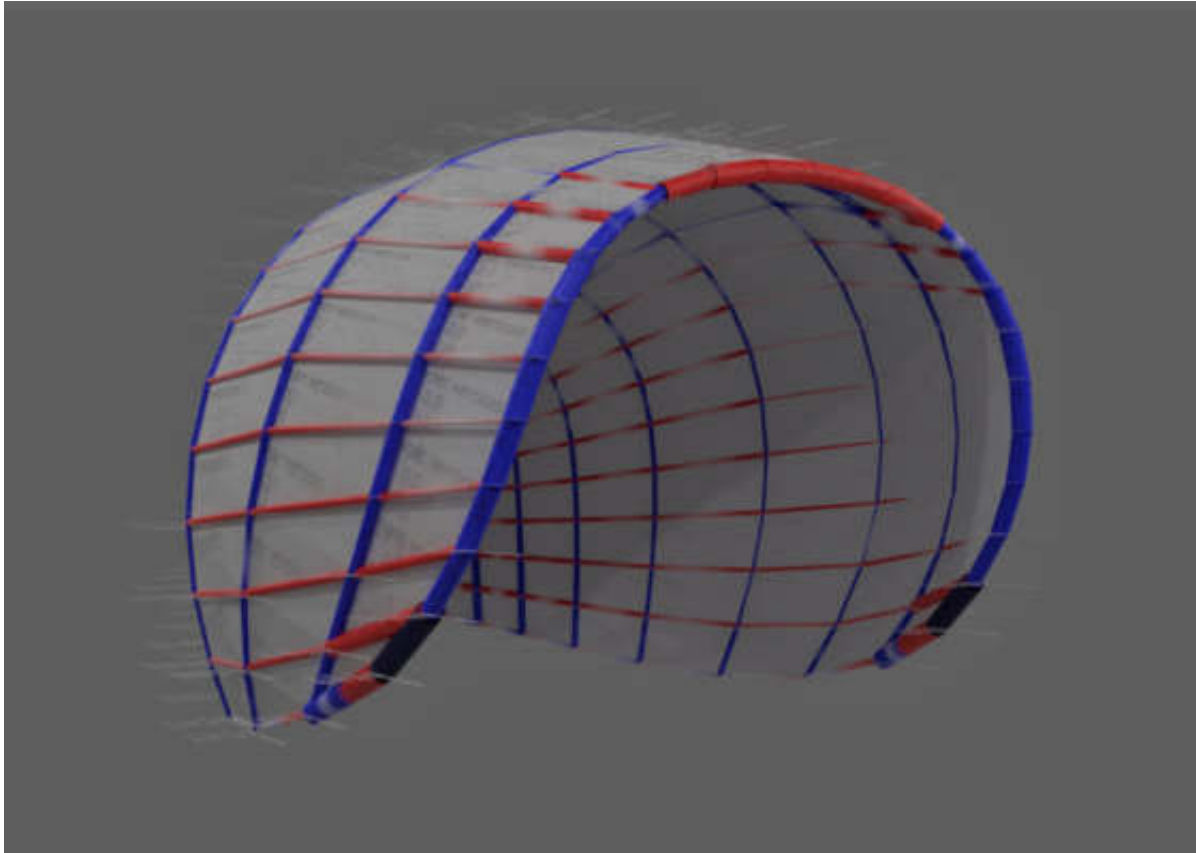
Ice Experiments



Form Finding



Calculation of Forces



Tensile Force

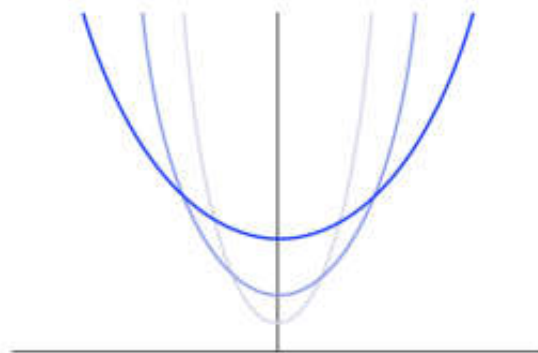


Compressive Force



Force overloaded Area

Chain Models



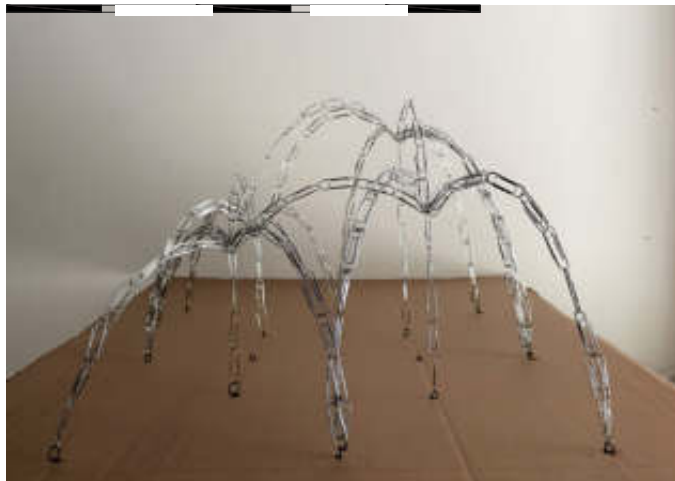


0 10cm 20cm 30cm 40cm 50cm

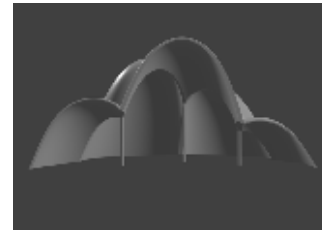
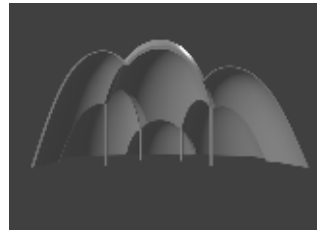
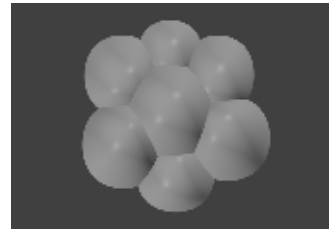
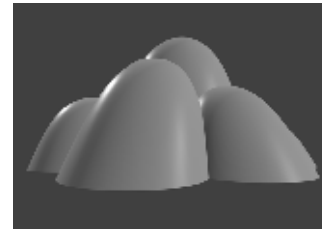
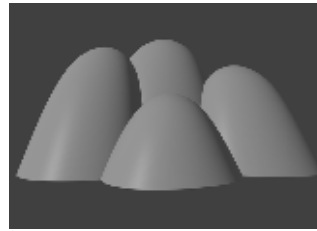
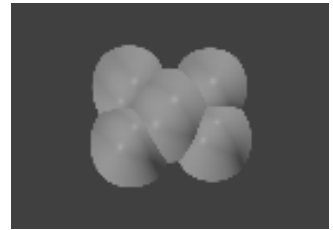
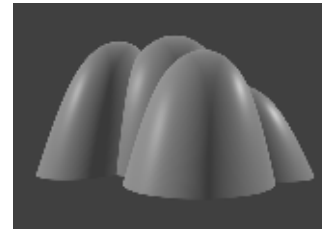
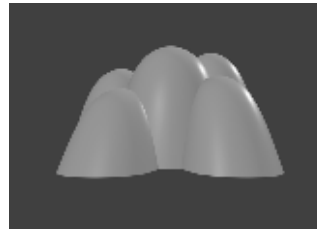
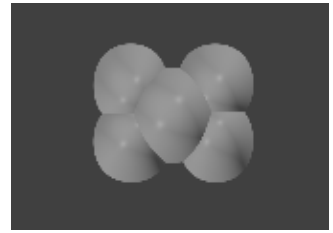
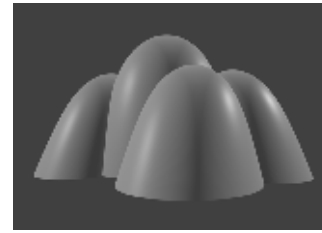
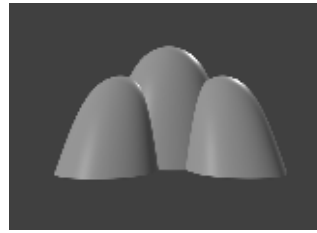




0 10cm 20cm 30cm 40cm 50cm



Form Variations and creating Ice





Test Cuboid	
A: $a \times b = 9 \times 6 =$	54 cm ²
V: $a \times b \times h = 9 \times 6 \times 5 =$	270 cm ³
m:	400 g
p: $m/V = 400/270 =$	1,48 g/cm ³



Sample 1



ample 2



Sample 3



Sample 4



Sample 5



Sample 6



Sample 7



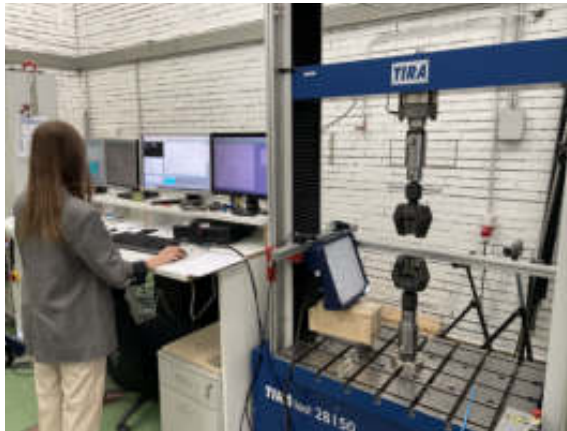
Sample 8



Sample 9



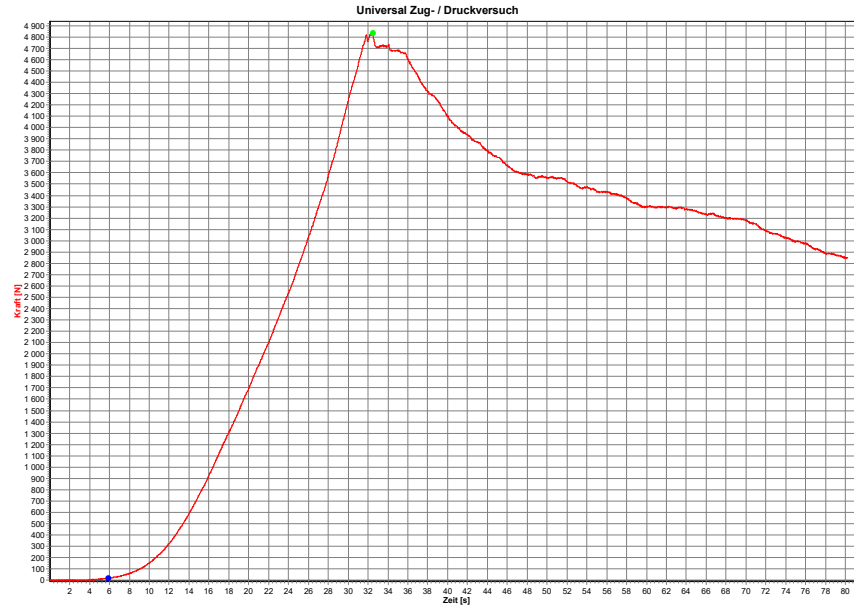
Sample 10



Sample 1: 100% water

Prüfparameter

Maschinentyp: TT 28150
Kraftaufnehmer: 150kN
Prüfgeschwindigkeiten: $V_0 = 10 \text{ mm/min}$; $V_1 = 10 \text{ mm/min}$



Ergebnis-Tabelle

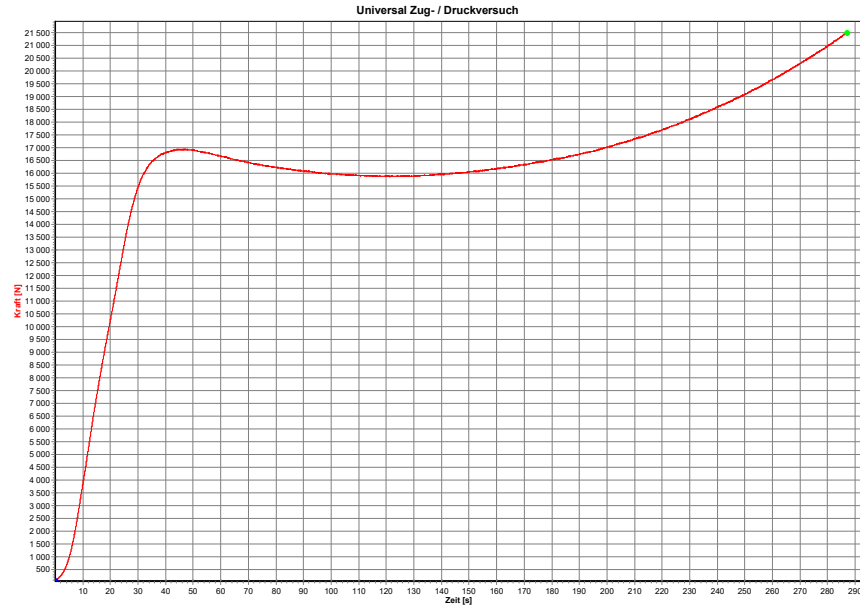
	Prüfkörpernummer	Bem.2	FH N
1	100%_Wasser		4841,25



Sample 4: 79% water + 21% sawdust

Prüfparameter

Maschinentyp: TT 28150
Kraftaufnehmer: 150kN
Prüfgeschwindigkeiten: V0 = 10 mm/min; V1 = 10 mm/min



Ergebnis-Tabelle

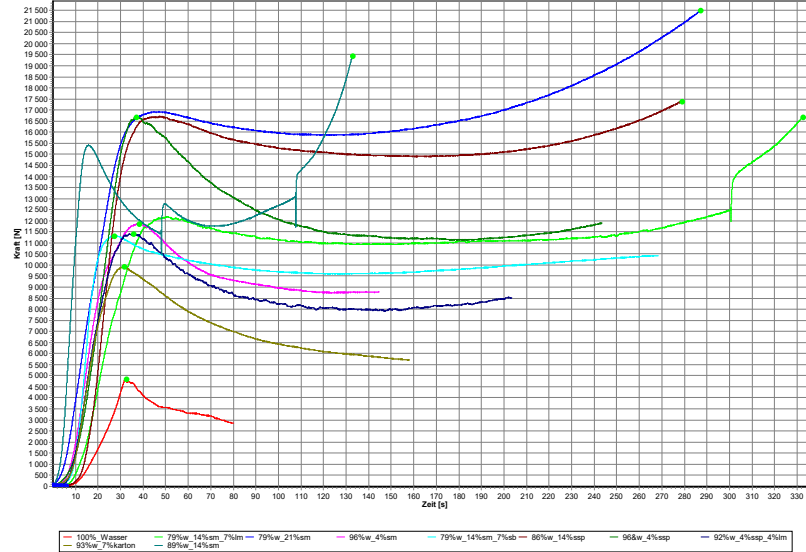
	Prüfkörpernummer	Bem.2	FH N
3	79%w_21%sm		21497,70



Prüfparameter

Maschinentyp: TT 28150
Kraftaufnehmer: 150kN
Prüfgeschwindigkeiten: V0 = 20 mm/min; V1 = 20 mm/min

Universal Zug- / Druckversuch



Ergebnis-Tabelle

	Prüfkörpernummer	Bem.2	FH N
1	100%_Wasser		4841,25
2	79%w_14%sm_7%lm		16695,90
3	79%w_21%sm		21497,70
4	96%w_4%sm		11856,75
5	79%w_14%sm_7%sb		11329,35
6	86%w_14%ssp		17394,30
7	96%w_4%ssp		16687,05
8	92%w_4%ssp_4%lm		11425,80
9	93%w_7%karton		9917,10
10	86%w_14%sm		19454,85

RESULT

Site Plan

±0,00 = 5364m



0 1 2 3 4 5 6 7 8 9

Floor Plan
 $\pm 0,00 = 5364\text{m}$



North View



0 1 2 3 4 5

East View



South View



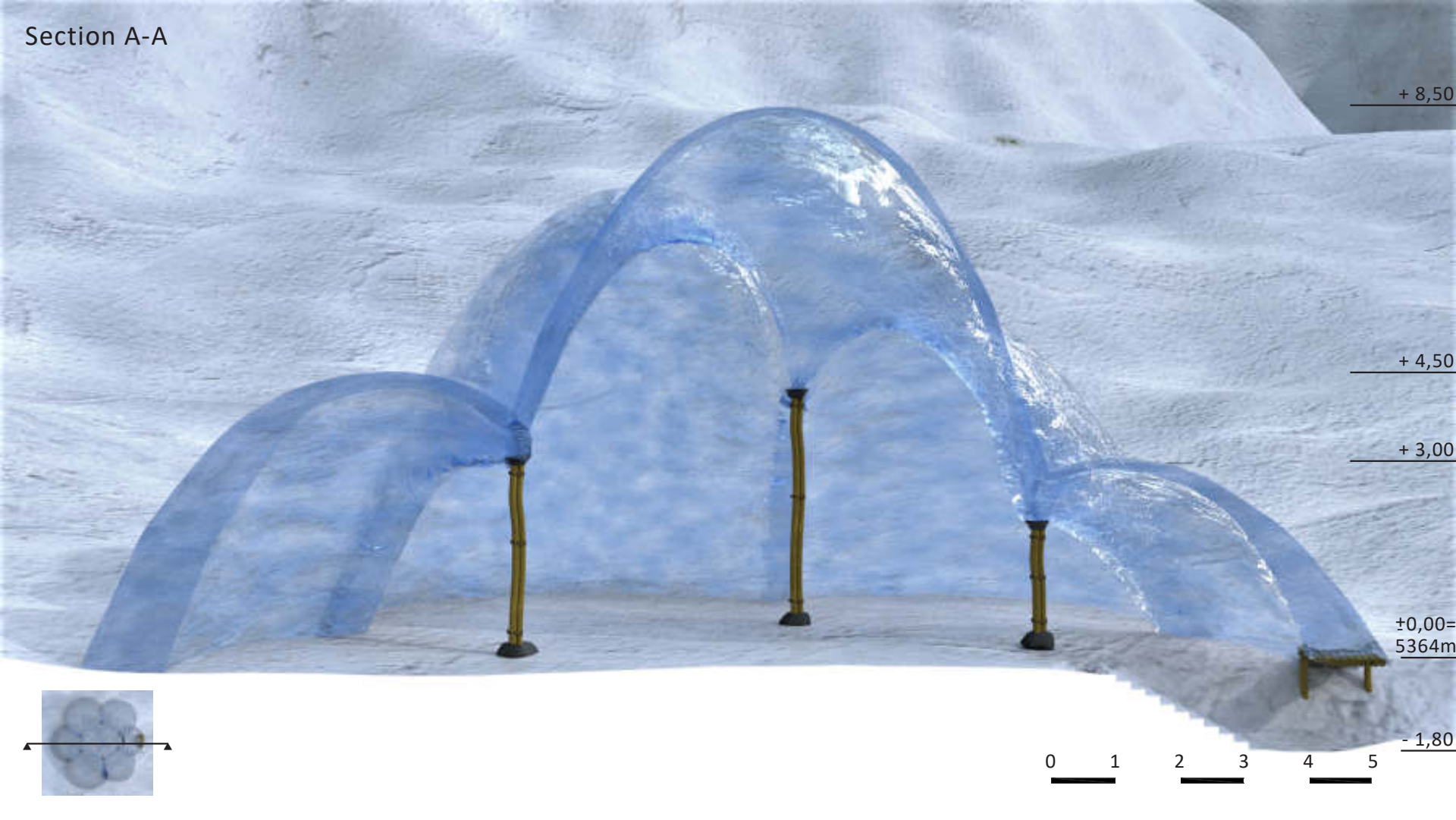
0 1 2 3 4 5

West View

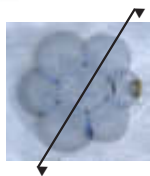


0 1 2 3 4 5

Section A-A



Section B-B



0 1 2 3 4 5

Construction Process















Layout Versions

± 0,00 = 5364m



bathroom

chillout area

kitchen

oven

dining area

raised sleeping area

entrance stairs

ramp



Version 1
 $\pm 0,00 = 5364\text{m}$



Version 2
 $\pm 0,00 = 5364\text{m}$



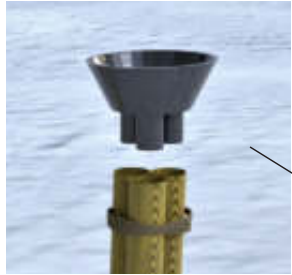
0 1 2 3 4 5



Version 3
 $\pm 0,00 = 5364\text{m}$



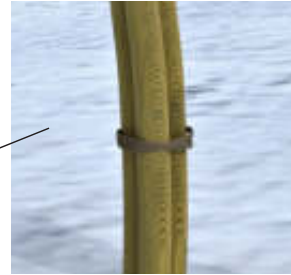
Details



connection between Ice shells and bamboo columns via metal hopper plugged into the bamboo canes

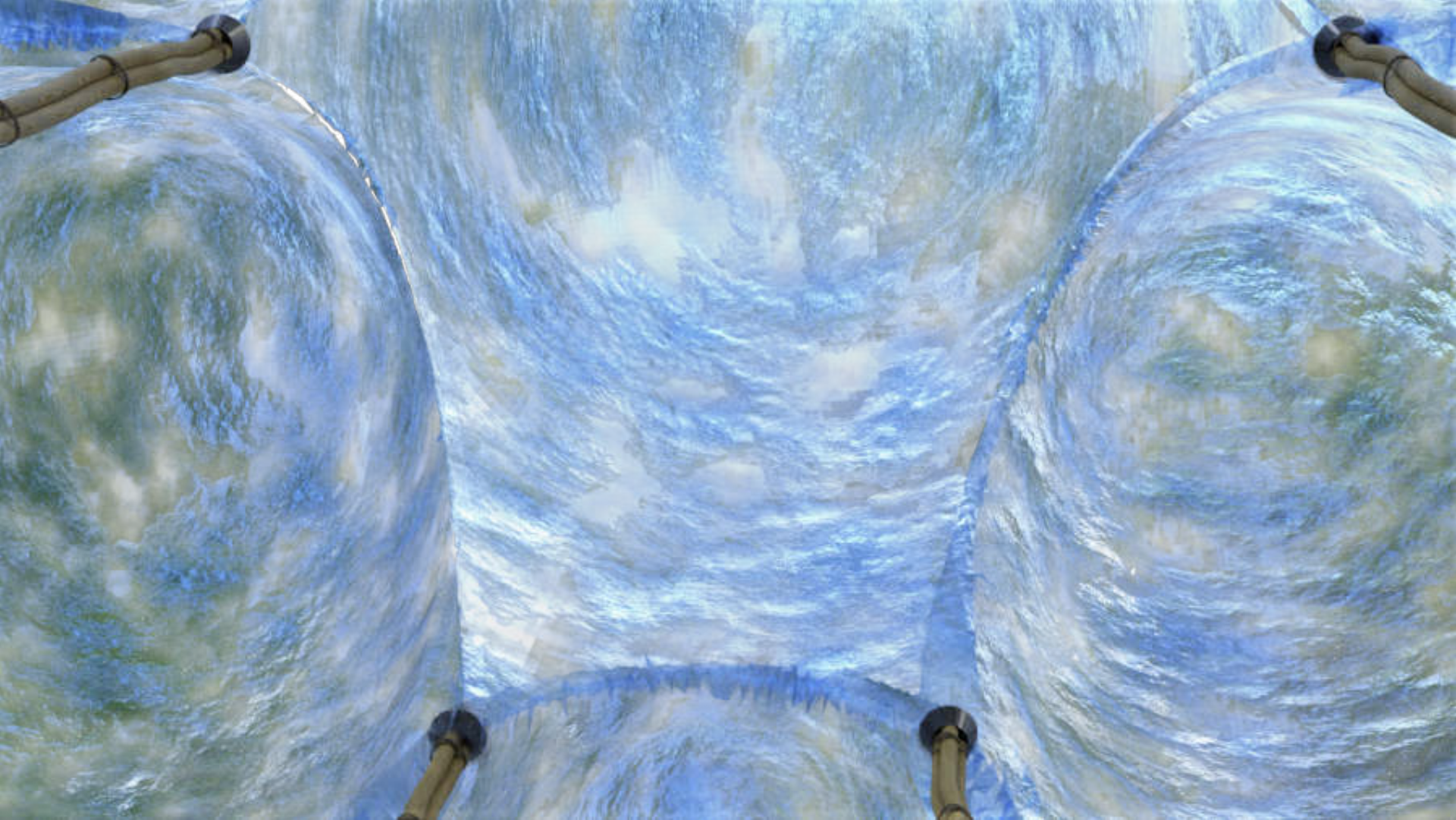


footing via traditional Asian stone and bamboo resting connection

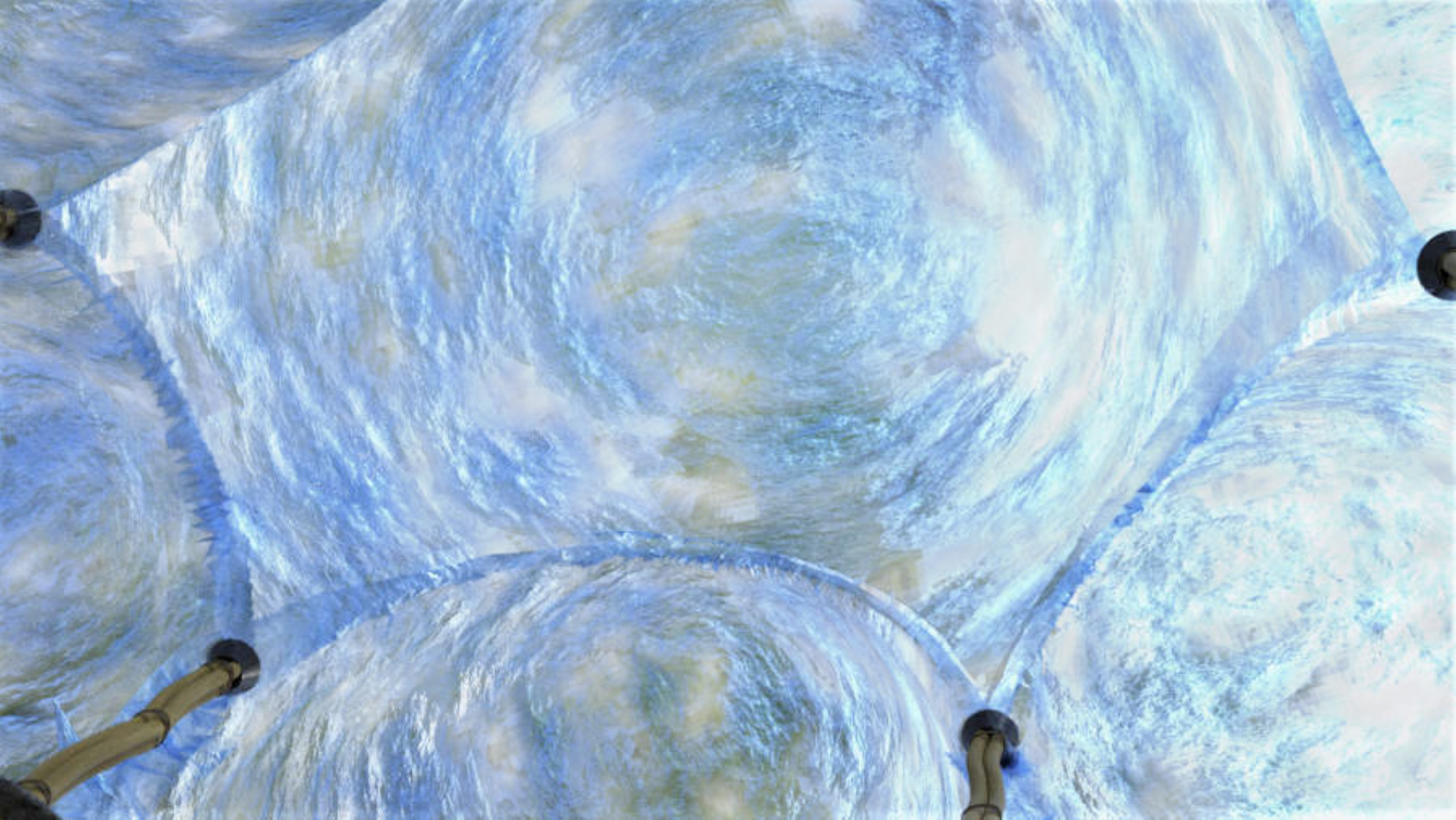


3 bamboo canes bundled and tied together













EVALUATION AND OUTLOOK





Himalaya at 5000m