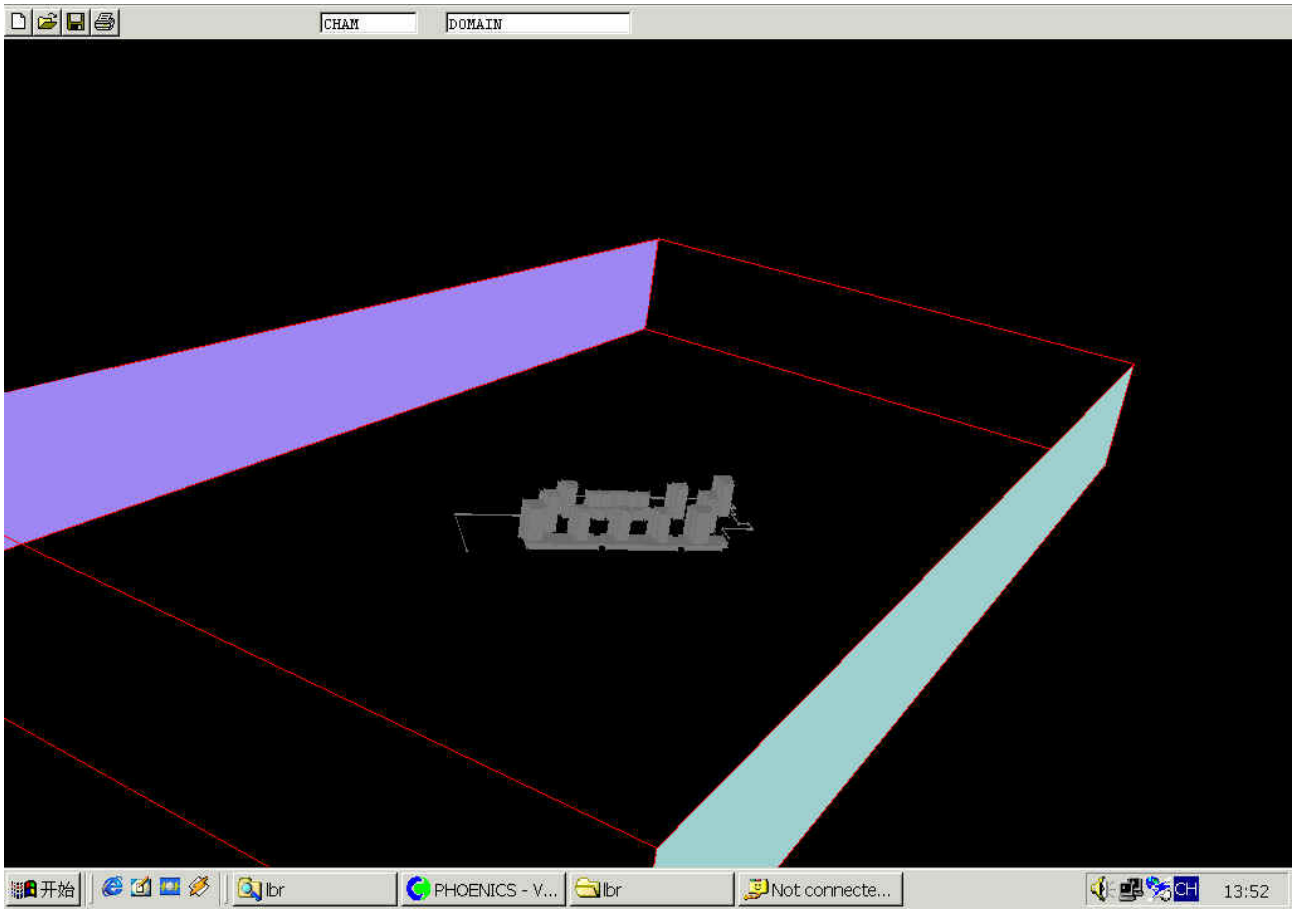
Outdoor Comfort Concept

Beaufort No.	Description	Wind Velocity (m/s)	Wind Effect
2	Light breeze	1.6-3.3	Wind felt on face
3	Gentle breeze	3.4-5.4	Hair disturbed
4	Moderate breeze	5.5-7.9	Raise dust and loose paper
5	Fresh breeze	8.0-10.7	Wind force felt by body
6	Strong breeze	10.8-13.8	Umbrellas used with difficulty
7	Near gale	13.9-17.1	Inconvenience felt when walking
8	Gale	17.2-20.7	Generally impedes progress
9	Strong Gale	20.8-24.4	People blown over

Case - Lanqiying

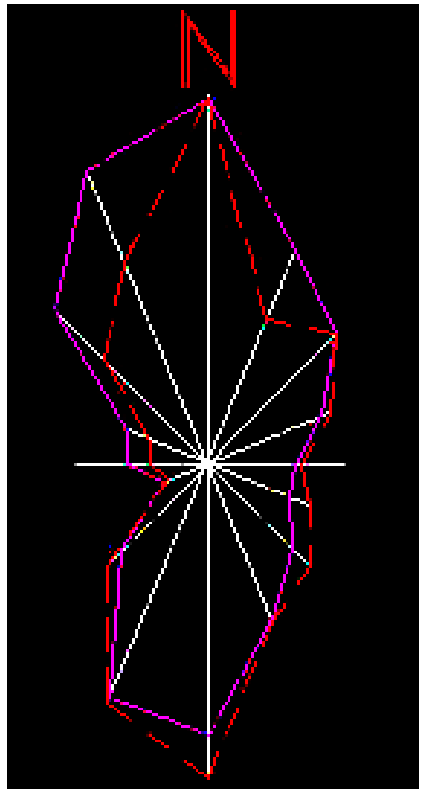
Calculation Domain

- Including all the buildings
- 3 times in width and length
- 5 times in height direction

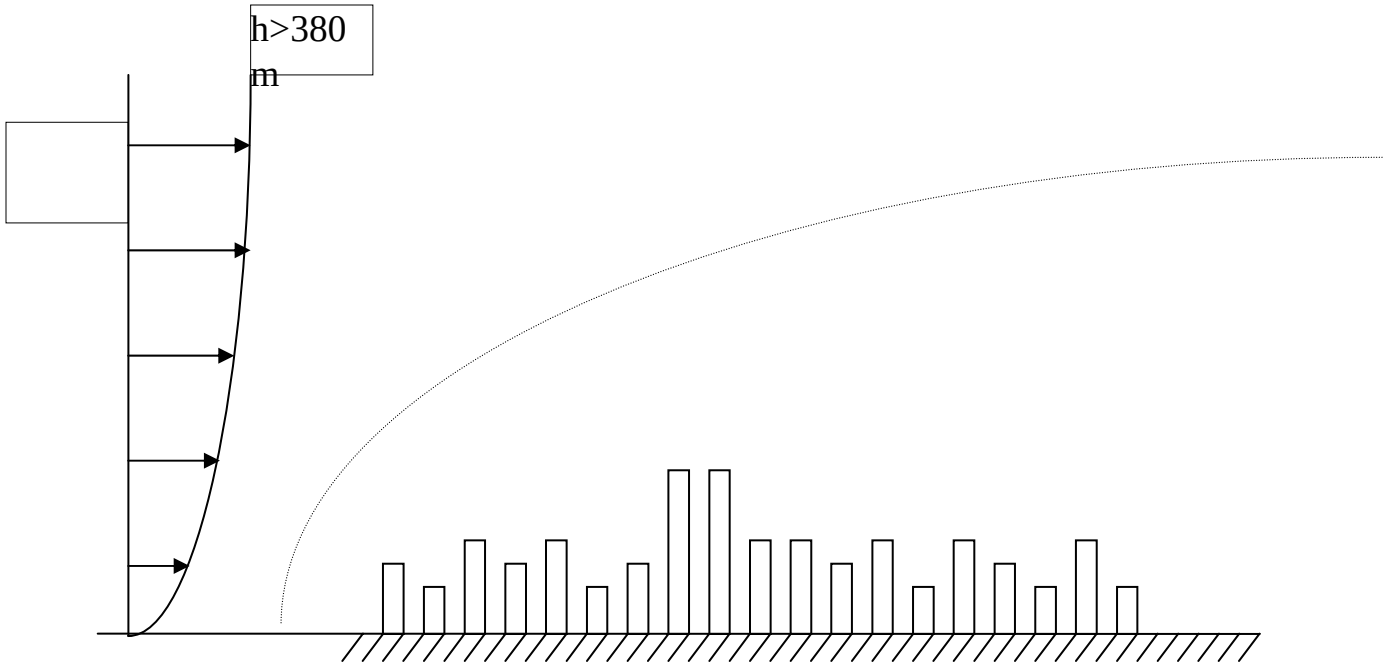


Boundary Conditions - Wind Direction

- Whether data in Beijing 1960-1990
- Wind Rose
- Fall & Winter – North and Northwest Average velocity 3m/s, frequent 5m/s
- Spring & Summer – South and Southwest Average velocity 5.5m/s



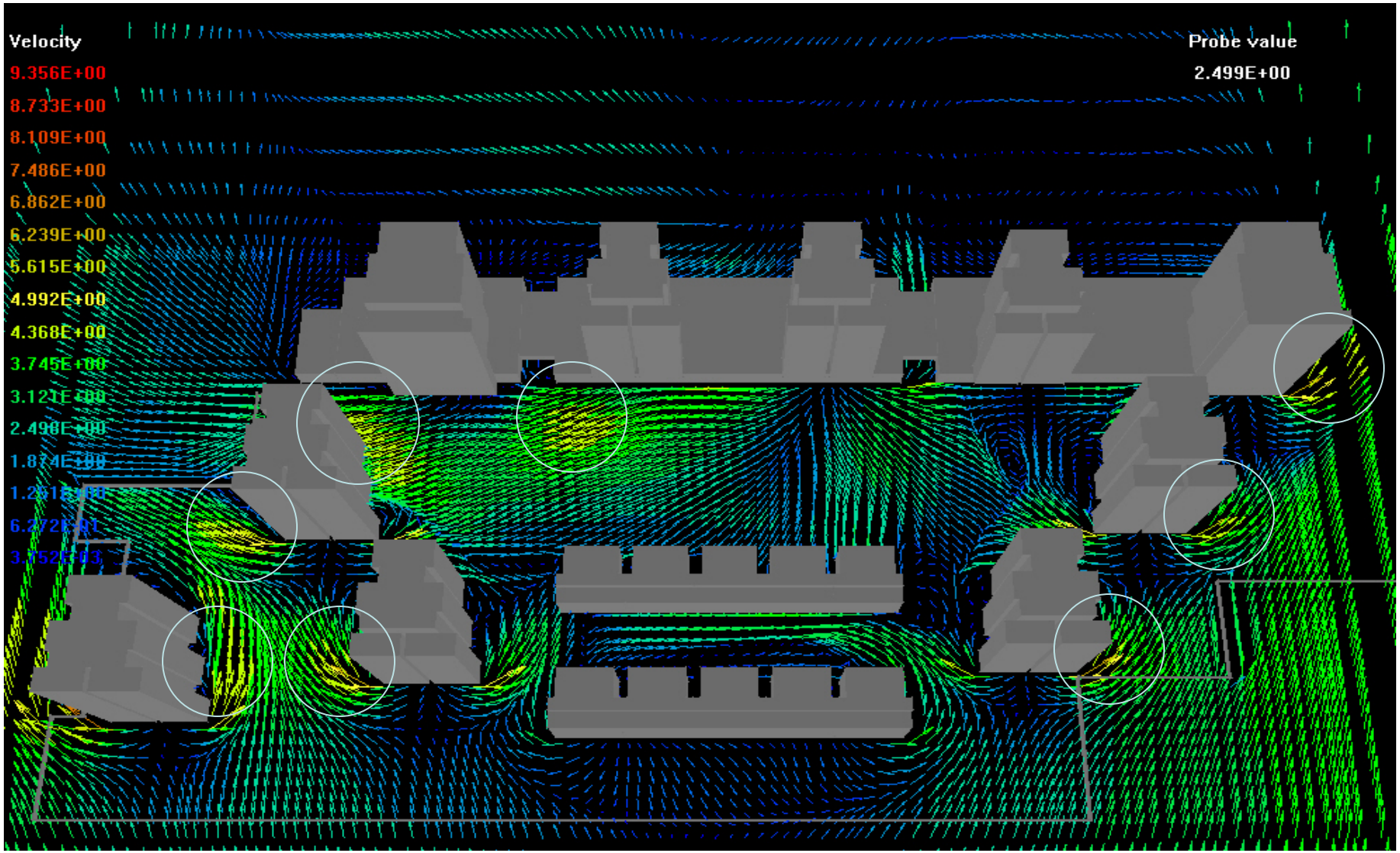
Boundary conditions – Wind profile



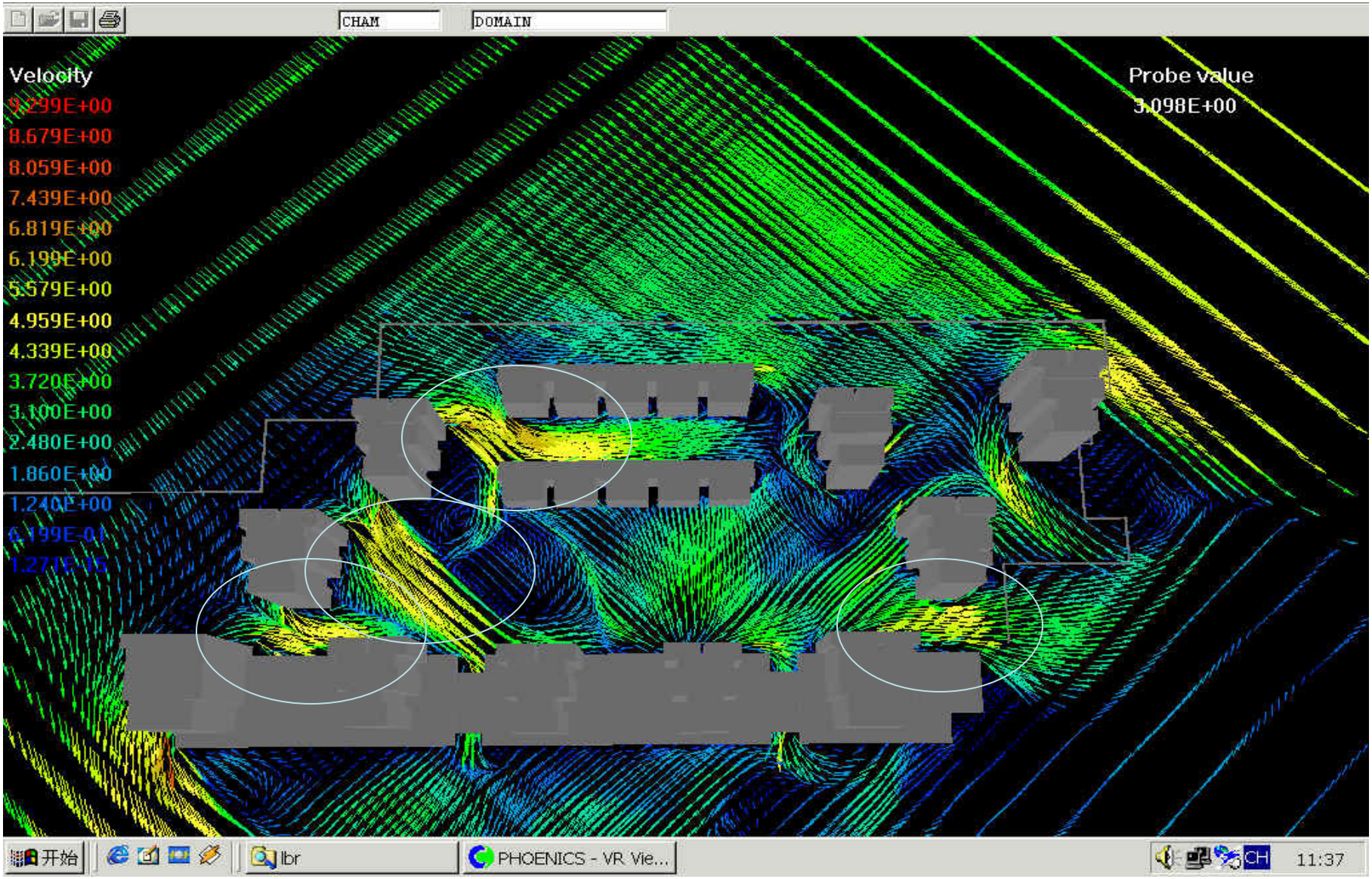
$$\frac{U}{U_g} = \left(\frac{Z}{Z_g} \right)^{0.28}$$

$Z = 10\text{m}, \quad U = 5\text{m/s}$

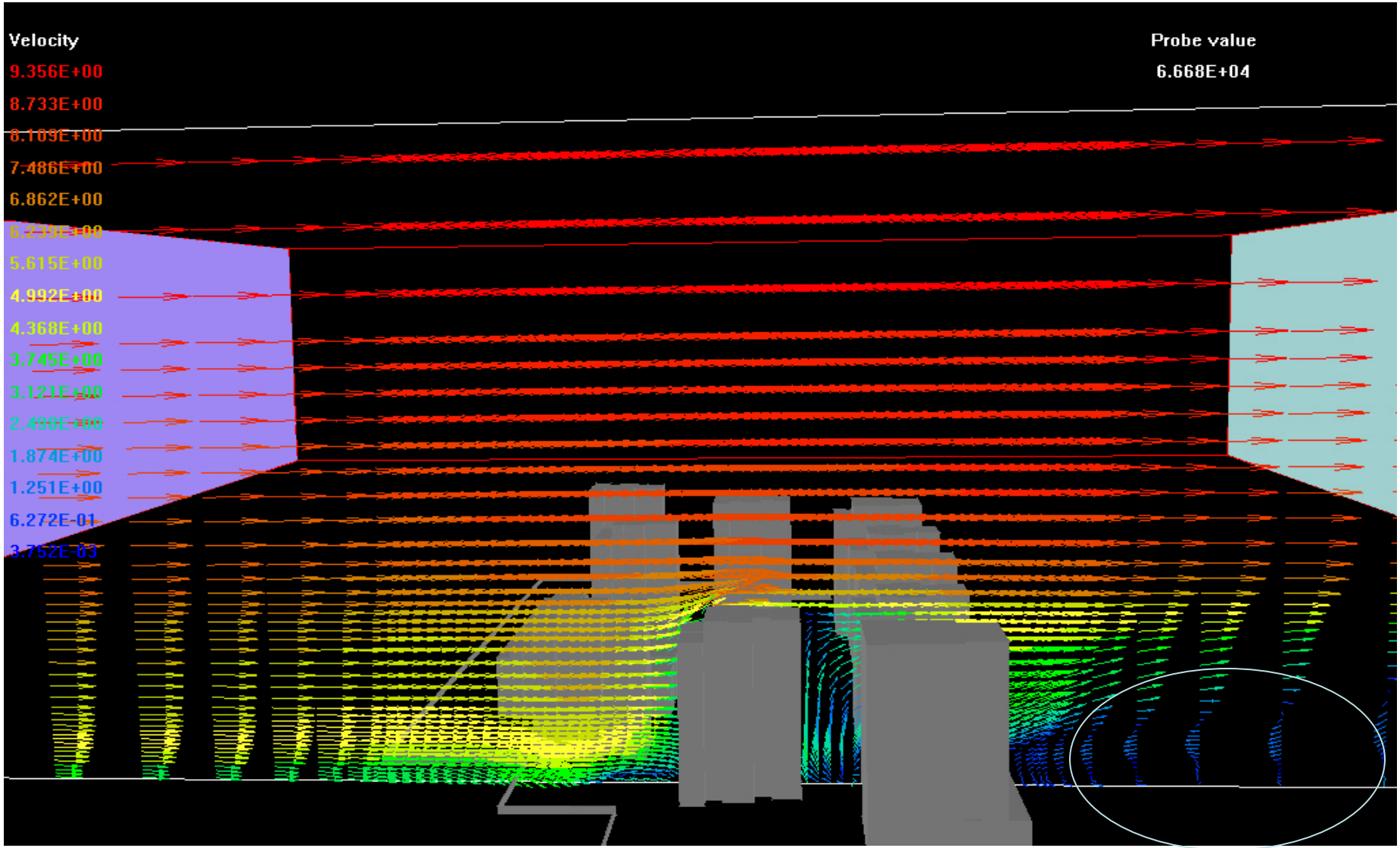
North Wind (1.5m above the ground)



Northwest wind, 1.5m



Vertical Distribution



Conclusion

- CFD is a fast and reliable tool for building analysis
- CFD can predict parameters such as Flow, temperature, CO2 concentration in great details
- CFD can be widely used to guide ventilation system design and building planning.

The END

Thanks!