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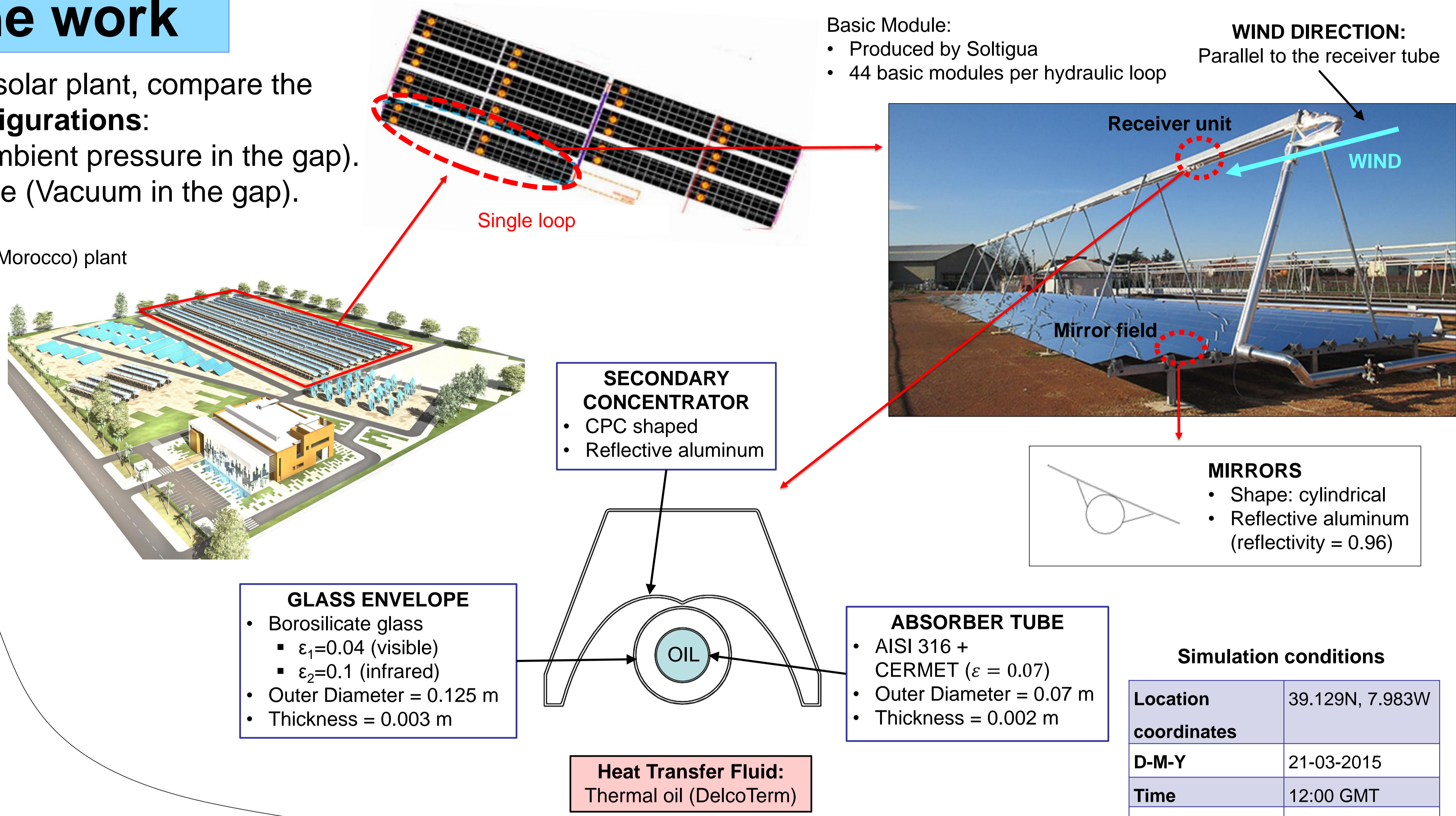
Aim of the work

In the context of a **Fresnel** based solar plant, compare the performance of **two receiver configurations**:

- Only encapsulated tube (air at ambient pressure in the gap).
- Evacuated and encapsulated tube (Vacuum in the gap).

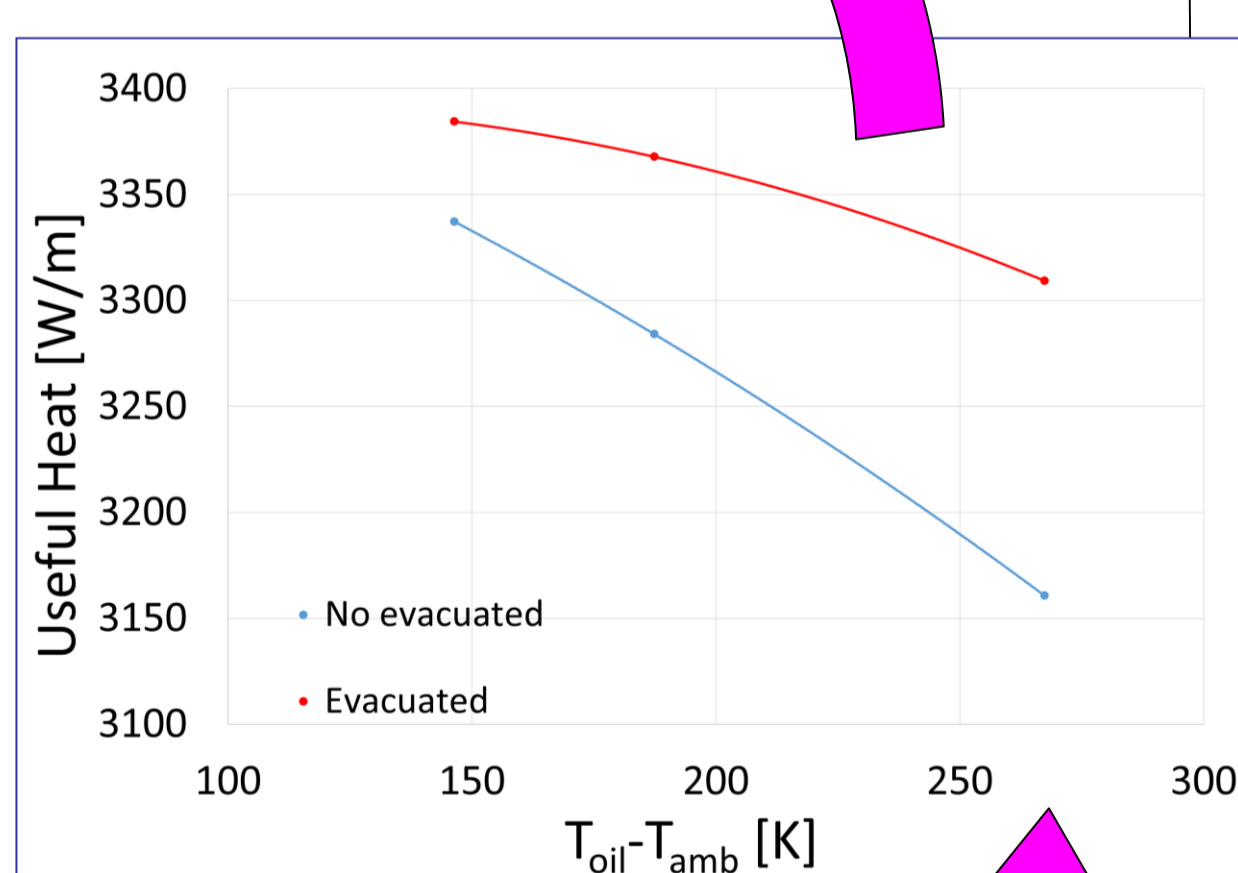
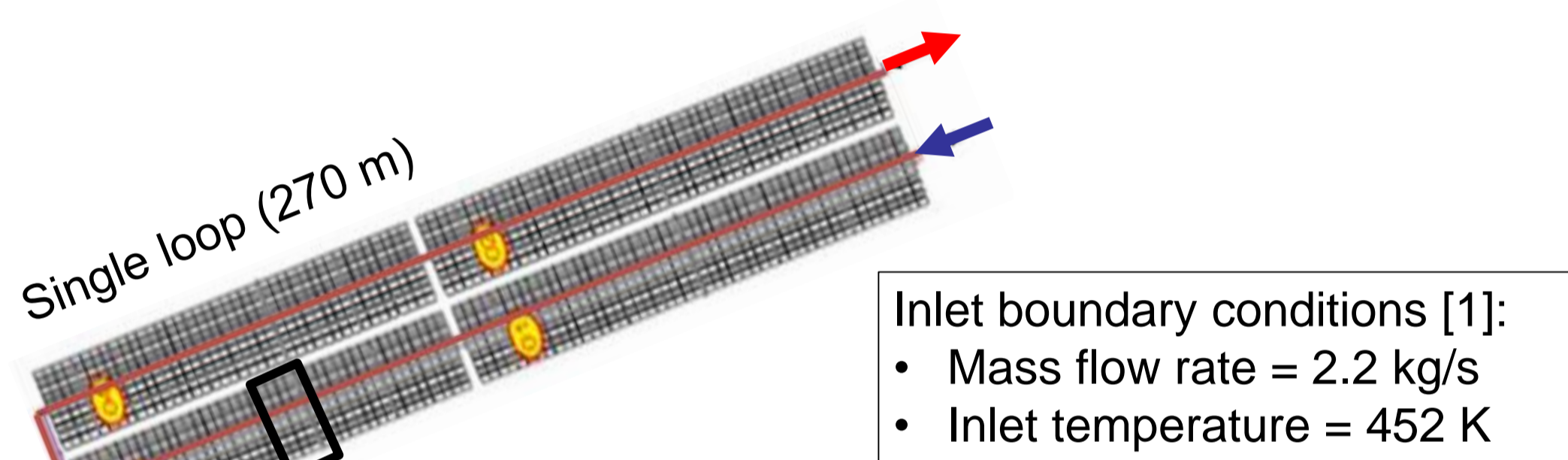
Reference Plant: 1MWe CSP-ORC Ben Guerir (Morocco) plant

- Collector type: Fresnel
- 7 equal hydraulic loops
- Length of the single loop = 270 m

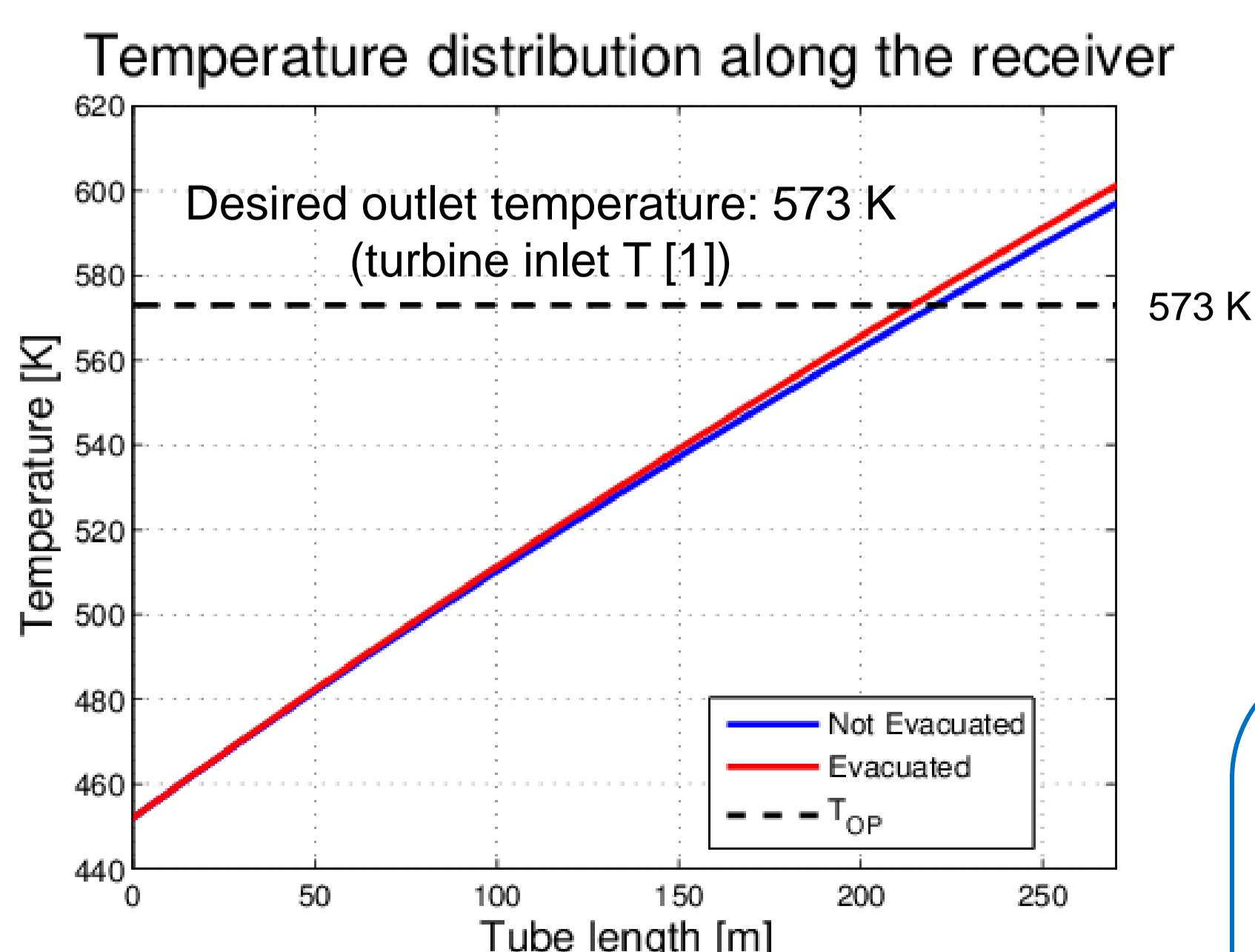


Model

1D along the HTF path

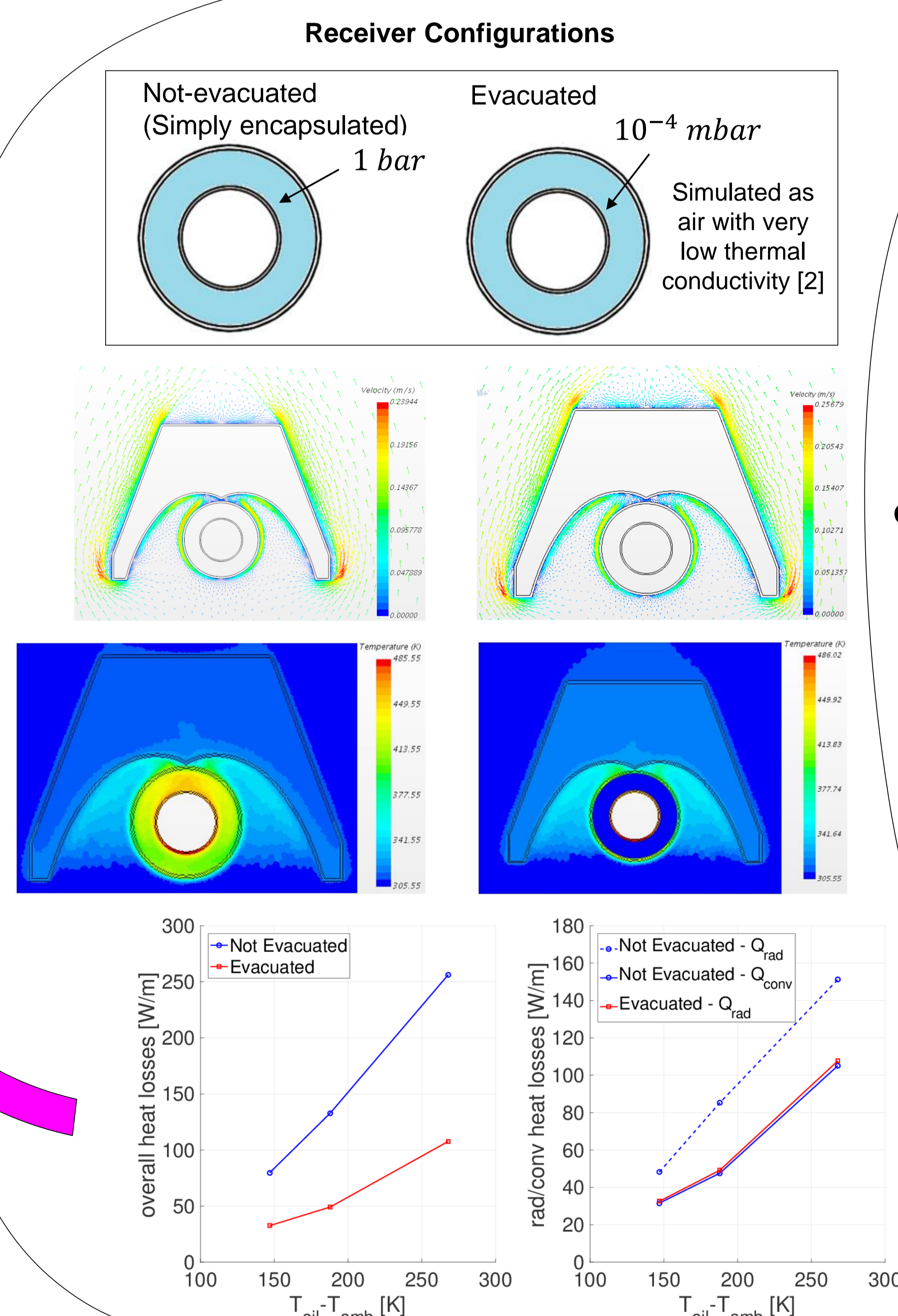


Oil temperature distribution along the receiver length

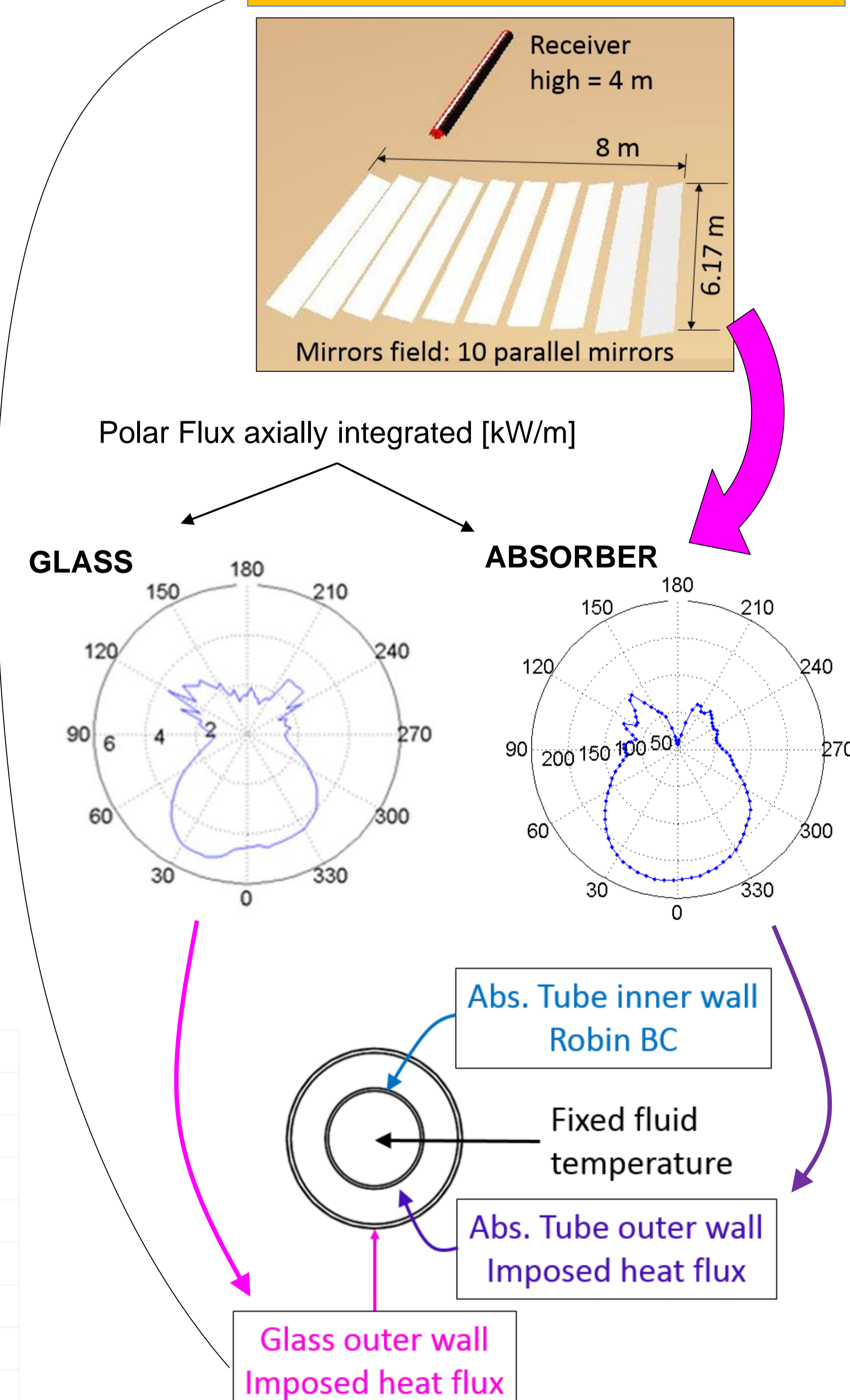


No dramatic difference in the performance of the two tubes

Convective/radiative heat losses- NO WIND (2D CFD Model)



Optic Analysis → heat flux distribution



Conclusions

- Both simply encapsulated and evacuated tubes able to reach the desired outlet oil temperature (573 K).
- Heat losses for the evacuated tube \ll than for the simply encapsulated one
- Heat losses $\leq 8\%$ of the useful heat
- Small variation in the overall performance

Perspective: Investigate influence of the wind (3D CFD model) on the receiver performance evaluating a proper convective HTC

[1] Soltigua "Solar field process description" Technical Report
 [2] R.Weerasinghe et al., CFD Modeling of thermo-electric devices for thermal management in downhole tools", Thermnic, 2015.