

# Correlative Impact of Shading Strategies on Sky Exposure and Cooling Performance at Pedestrian-level in Street Canyon

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Shading strategies in street canyon are essential for reducing sky exposure and optimizing outdoor thermal environment, especially in the hot and humid climate zone. However, over shading might damage the thermal dissipation potential in a street canyon.



Fig. 1. Aero and street view at a Traditional Shophouse Neighbourhood in Guangzhou, China

Traditional shophouse neighbourhoods (TSNs) in southern China is a good reference on climate-adapted urban morphology since they integrate multiple shading strategies properly.

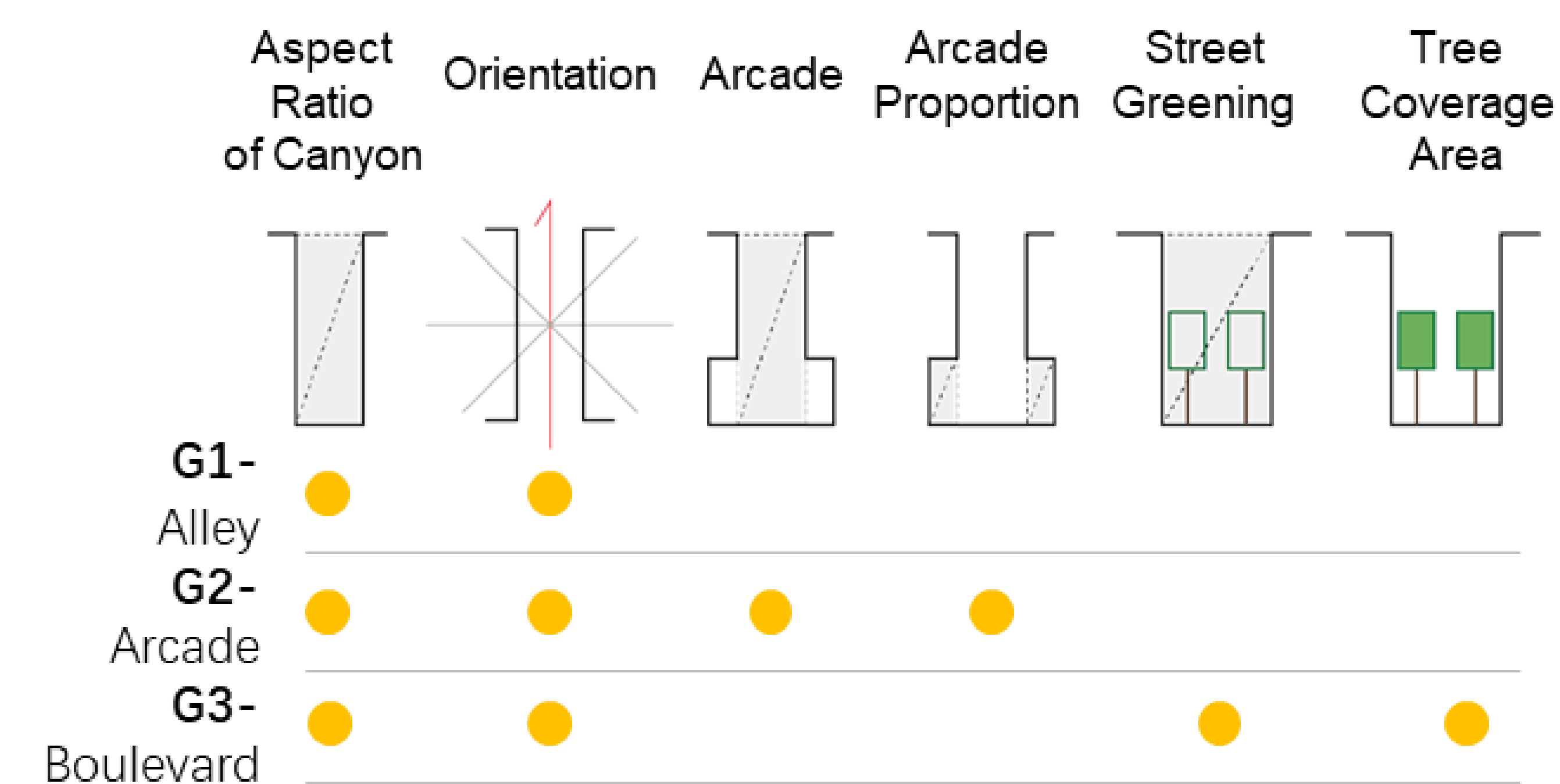


Fig. 2. Parameters investigated in three groups

In this paper, the correlative impact of four shading strategies of TSNs on sky view factor (SVF) and pedestrian-level thermal comfort are investigated, including aspect ratio of canyon, axis orientation, proportion of arcade, and tree coverage area. The concept of physiological equivalent temperature (PET) load is applied on assessing the cooling performance in different experimental case.

The results illustrate that: the cooling performance of the streets with border tree in high SVF are better than the streets only shading by building geometry; the cooling effect of shading facilities is getting weak in street canyon with low SVF (SVF < 0.1 on the middle of pedestrian area). Furthermore, a proper value range of the above four shading strategies is given for guiding climate responsive street canyon design.

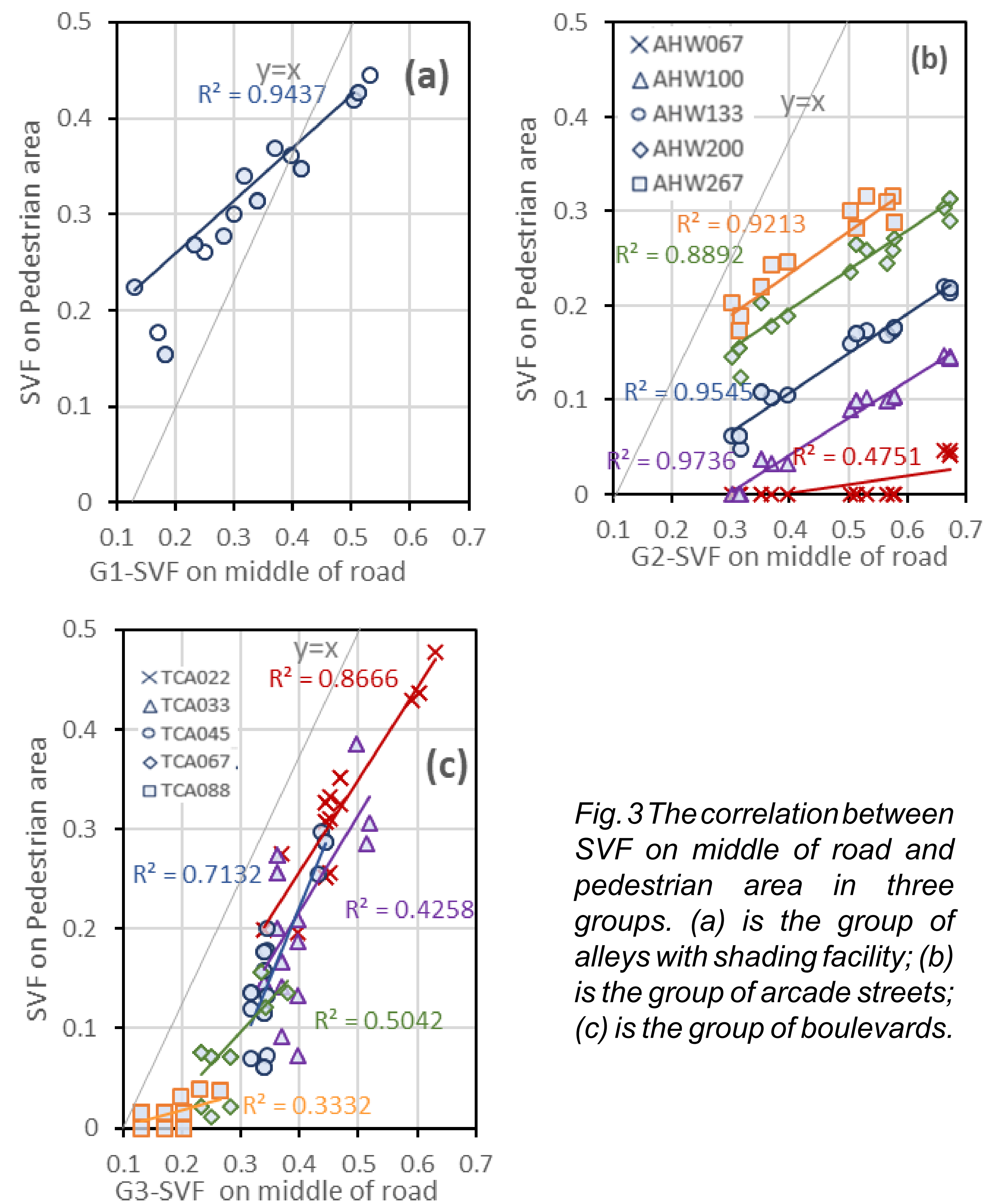


Fig. 3 The correlation between SVF on middle of road and pedestrian area in three groups. (a) is the group of alleys with shading facility; (b) is the group of arcade streets; (c) is the group of boulevards.

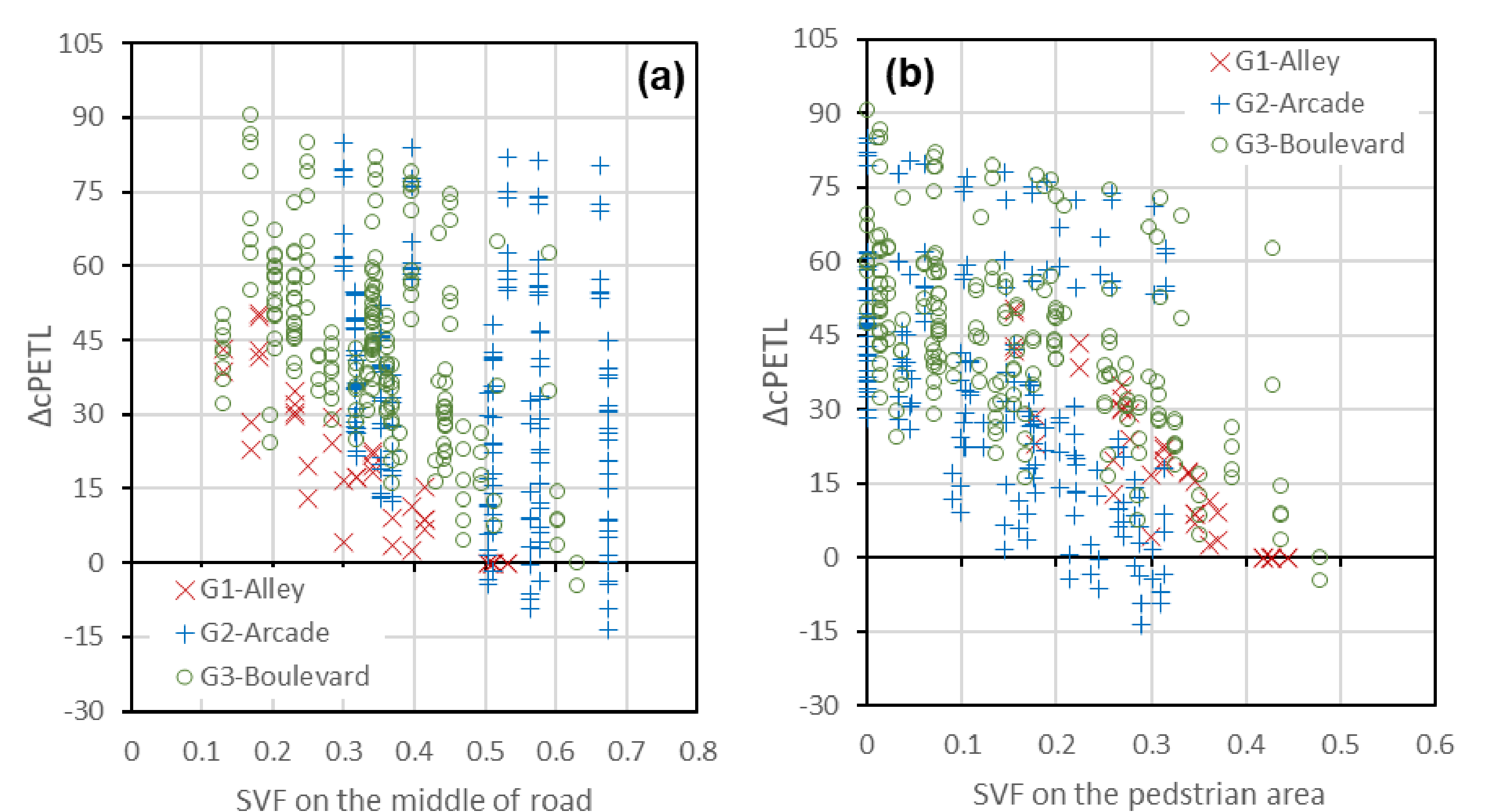


Fig. 4. The correlation between SVF and  $\Delta cPETL$  of the point on the middle of road (a) and pedestrian area (b)

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