(Scientific Data)

The Mechanism of Generation of a Japanese Cedar Pollen Cloud by Meso-Scale Air Turbulence*

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On March 7, 1990, at Ashigara Pass in Kanagawa Prefecture, we observed the generation of a Japanese cedar (*Cryptomeria japonica*) pollen cloud, which was the largest of its kind we have ever seen. We successfully took serial photographs of the forming pollen cloud. The data were analyzed by computer, and the results indicated the following mechanism of generation of a pollen cloud (see, Figs. 1 and 2).

Figs. 1 - 2, A : Small-scale Japanese cedar pollen clouds are produced from several sites of the slope covered with orderly arranged Japanese cedar trees due to an air current rising from the valley between ridges. The clouds transfer to the upper part of the ridge, forming narrow strips of cloud. Some strips of pollen cloud merge into one group due to a difference in wind velocity between the upper and lower parts of the ridge, and become widened while transferring.

Figs. 1 - 2, B : Strips of pollen cloud which have transferred halfway up the mountain merge into a wide and long belt and begin to join narrow strips of pollen cloud produced successively. Then the belt of pollen cloud on the ridge becomes obscure at its upper and lower edges, and develop into a large-scale pollen cloud staying halfway up the mountain in the form of a wider and longer belt. Small-scale pollen clouds are produced one after another from the lower part of the Japanese cedar wood.

Figs. 1 - 2, C : The wide belt of pollen cloud lying halfway up the mountain abruptly begins to extend longitudinally, riding an up-current of air rising from the valley toward the top of the mountain, and assumes a thick columnar form.

Figs. 1 - 2, D : The thick column of pollen cloud ascends while whirling like a tornado. It seems that the cloud ascends by the meso-scale air turbulence, namely virture of the drawing effect of ascending air currents, while spreading over the upper air.

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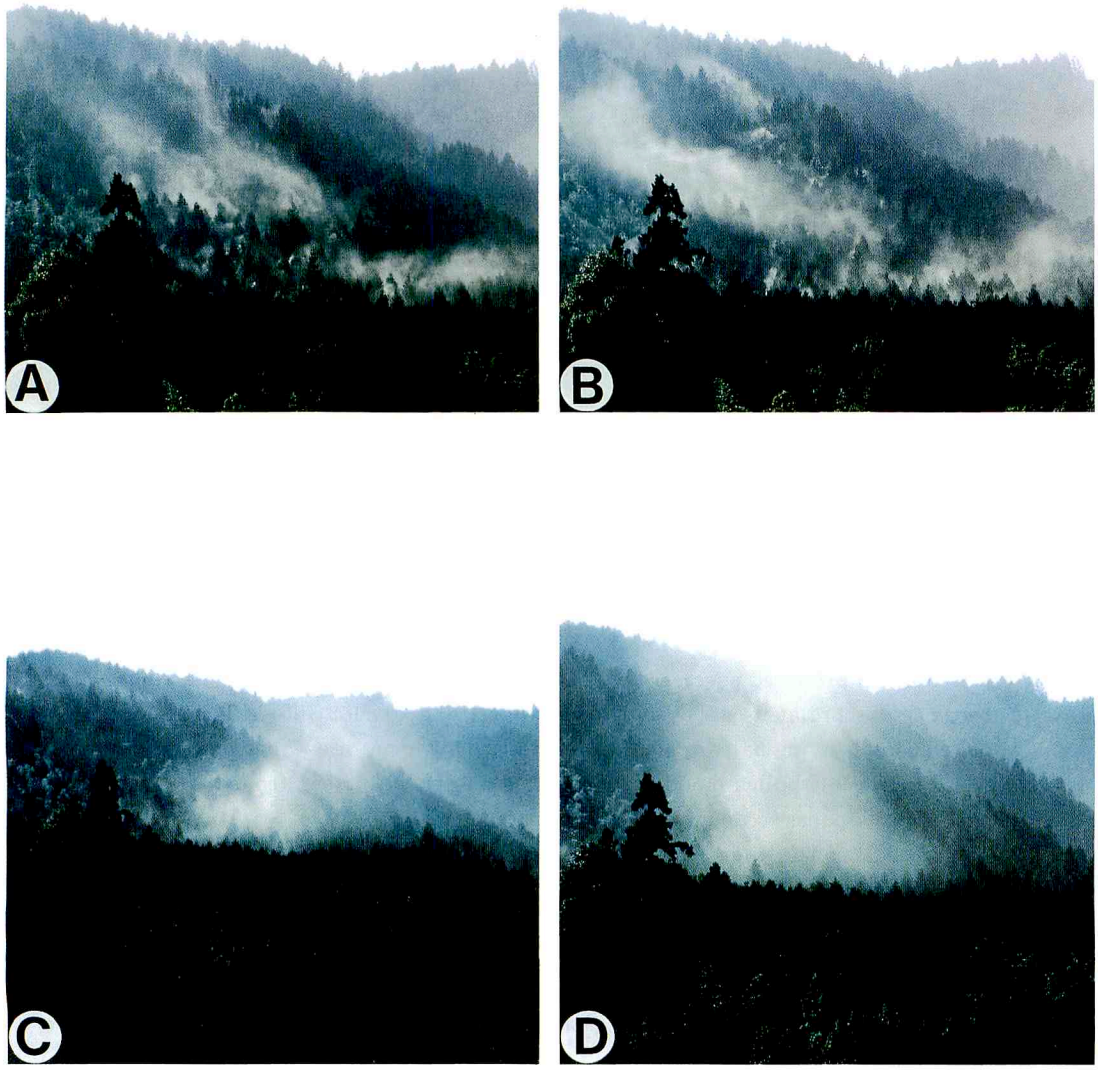

Fig. 1. Serial photographs of the forming Japanese cedar pollen cloud.

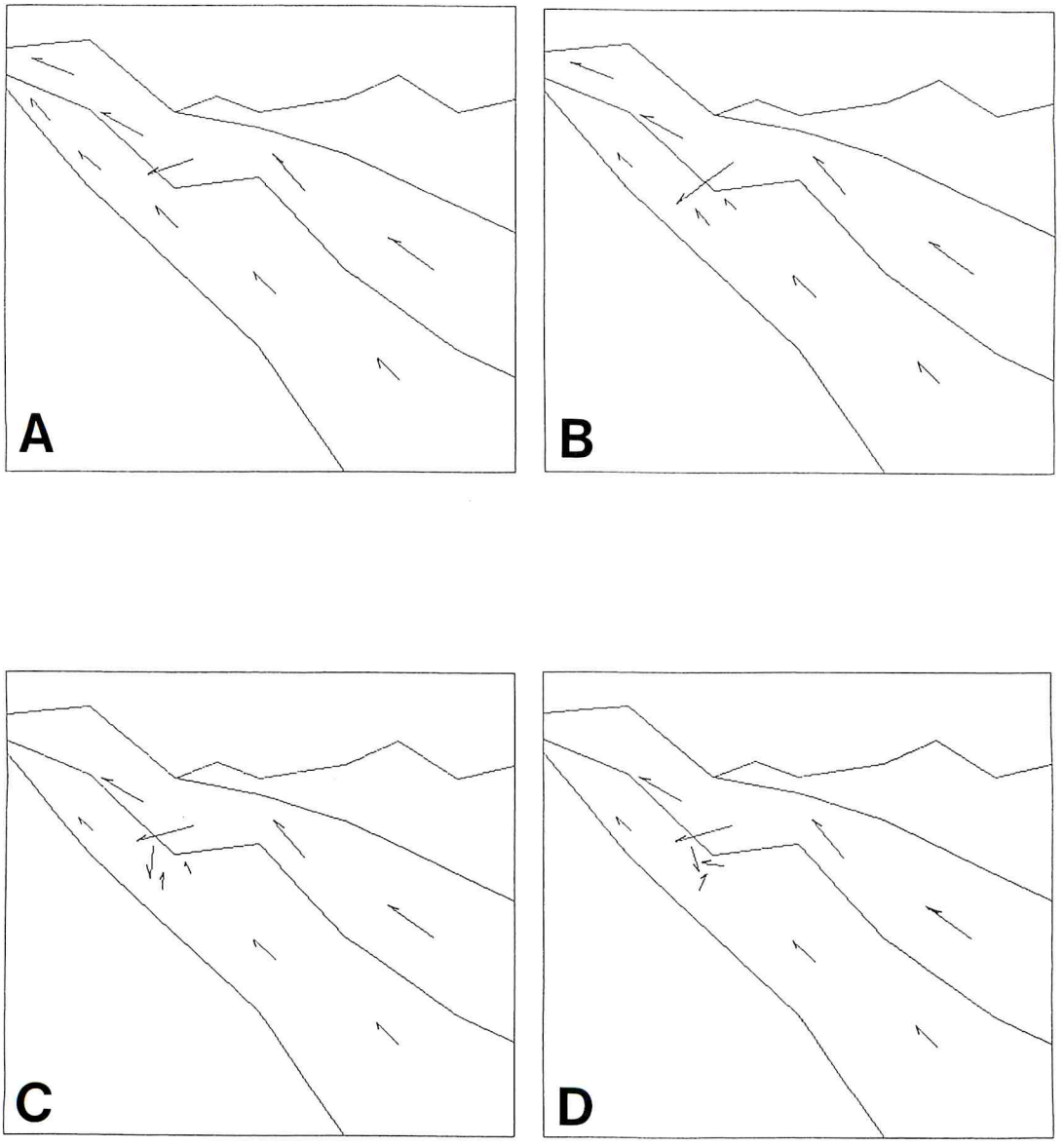

Fig. 2 . Serial computer models of the forming Japanese cedar pollen cloud.

（学術資料）

乱流によるスギ花粉雲の発生過程

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われわれはこれまでに観測した最大のスギ花粉雲発生の瞬間を，1990年3月7日，神奈川県足柄峠で観測し，連続写真撮影に成功した．これをコンピューターで解析した結果，次のような花粉雲の発生メカニズムの結果を得た．

Figs. 1-2, A：山の尾根に整然と植えられたスギ林の数箇所から尾根の間の谷を吹き上げてきた上昇風により小規模のスギ花粉雲が発生し，細い帯状となって尾根の上部へ移動する．尾根上下の風速の違いにより花粉雲の帯が尾根上部で合流し，移動しながらやや幅が広くなる．

Figs. 1-2, B：山の中腹に移動した花粉雲の帯は合流して幅広く，長くなりはじめ，下部の尾根から遅れて発生した花粉雲の細い帯とも合流し，上下の境が不明瞭となって広い帯状の大規模な花粉雲に発達する．

Figs. 1-2, C：ほぼ山の中腹に幅広く帯状となっていた花粉雲は突然谷から頂上へ吹き上げた強い上昇気流により，縦に伸びはじめ，太い柱のような花粉雲を形成しはじめる．

Figs. 1-2, D：太い柱のようになった花粉雲は大きな渦となって竜巻のように上空へ登りはじめた．恐らく乱気流によるもので，すなわち上空に花粉雲が拡散しながら上昇気流によって吸い上げられるように上昇しているものと解釈できる．