

Avances en simulación de calidad del aire de emisores puntuales. Esquema adaptativo 3D multimalla

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Esquema adaptativo FEM

- Ejemplo simplificado
Convección-Difusión, con
velocidad y K_{zz} realistas
(condiciones neutras).
- Emisor puntual, esfera de
5m de radio, dominio
 $24 \times 96 \times 3$ km
- S. Ghorai, AS Tomlin, and M. Berzins. Resolution of pollutant concentrations in the boundary layer using a fully 3D adaptive gridding technique. *Atmospheric Environment*, 34(18):2851 {2863, 2000.

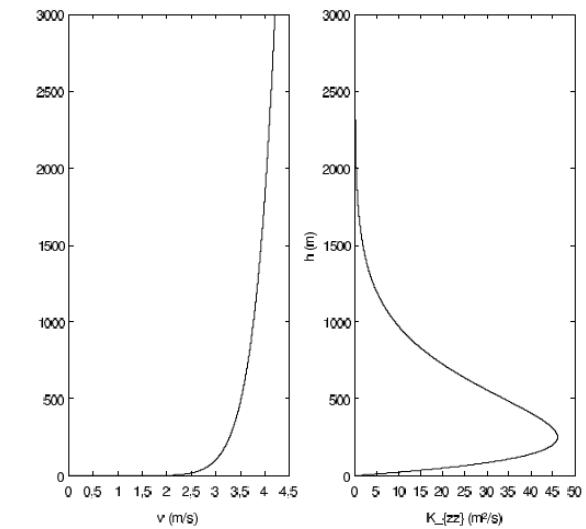
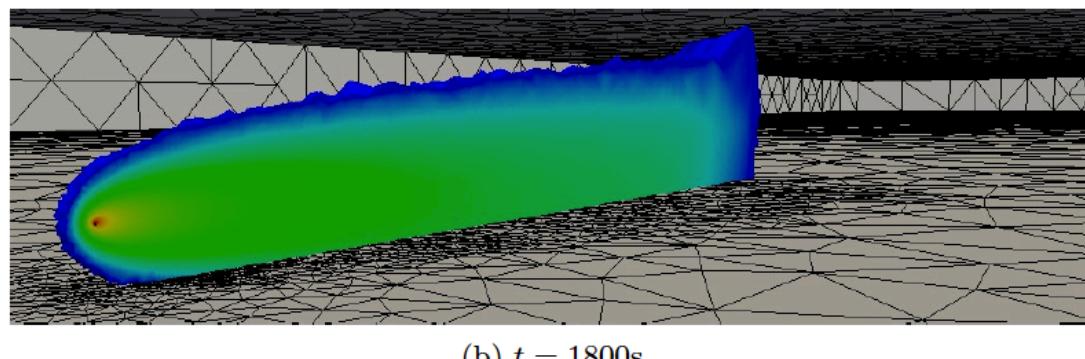
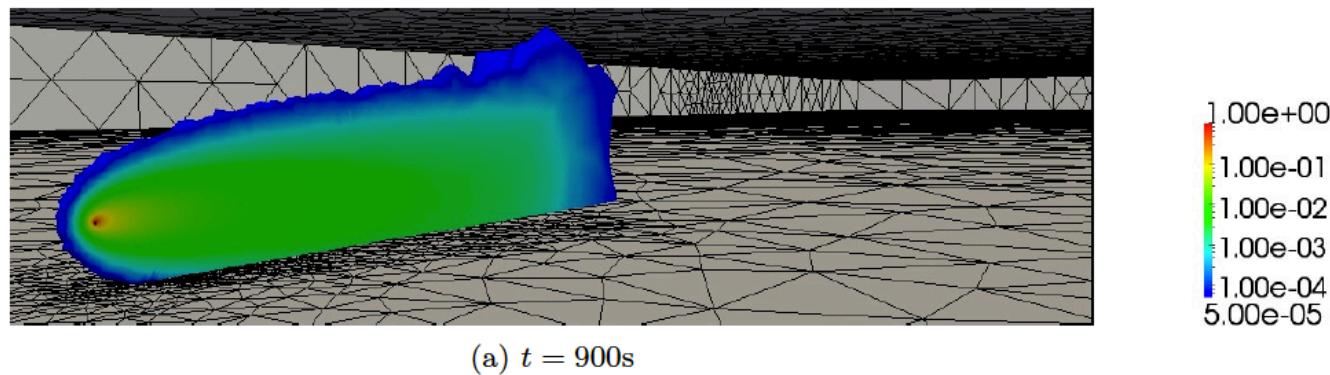
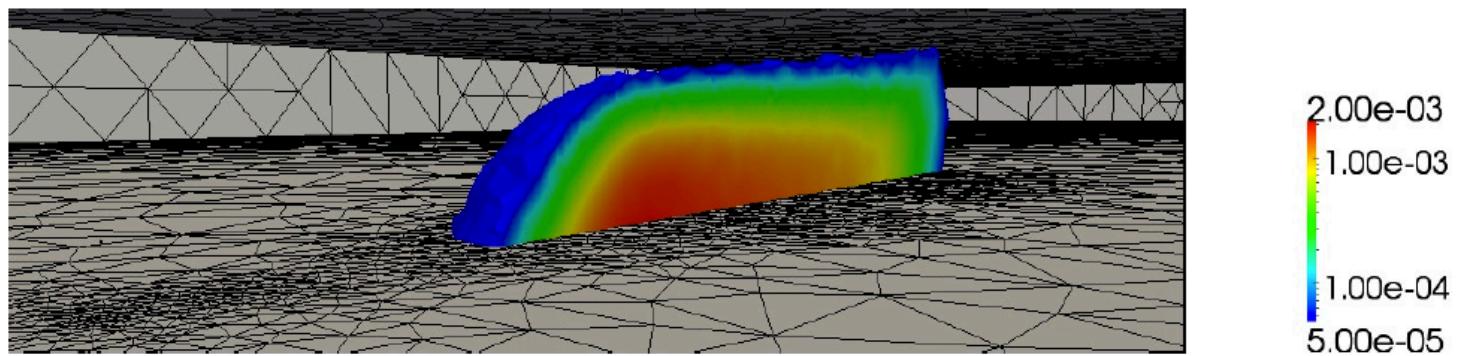


Figura 5: Perfil del módulo de la velocidad y de la difusión vertical en función de la altura

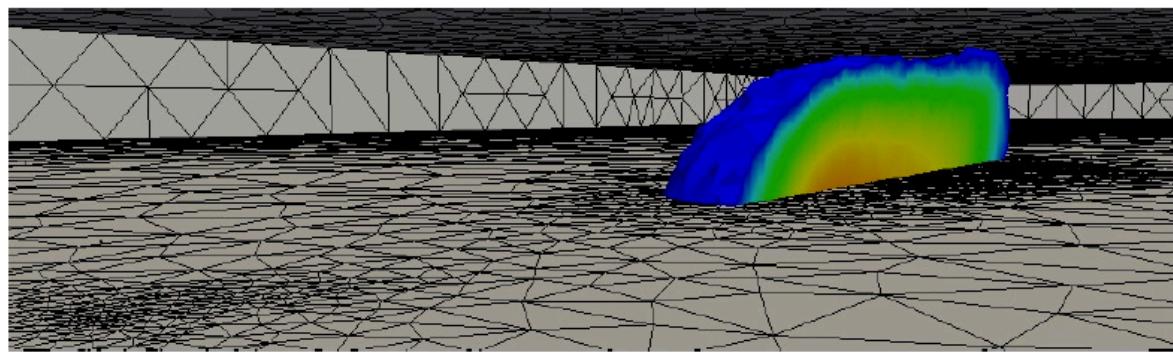
- # Resultados Convección-Difusión 1 especie.

Monforte, Pérez-Foguet (2012), “An adaptive scheme for convection-diffusion problems in three-dimensions”, submitted to Rev. Int. Met. Num. Ing.



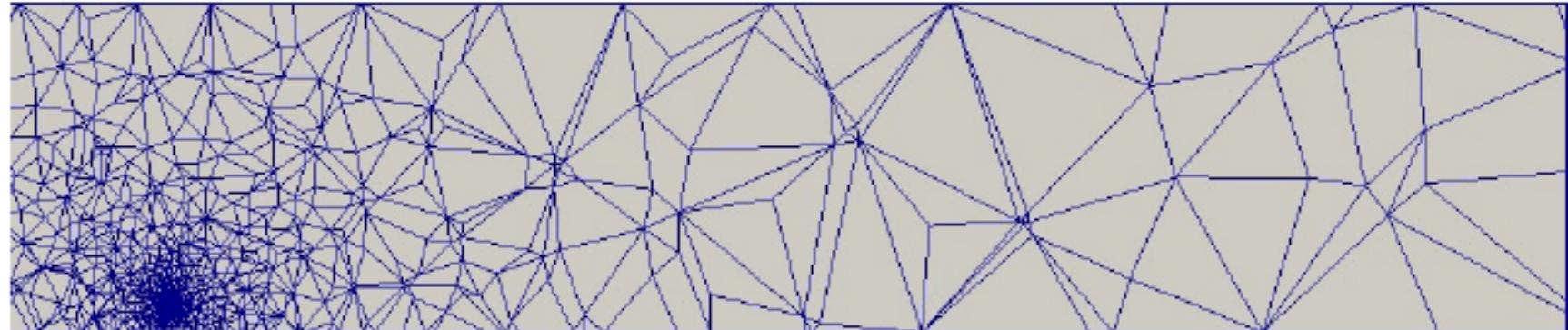


(d) $t = 2700\text{s}$



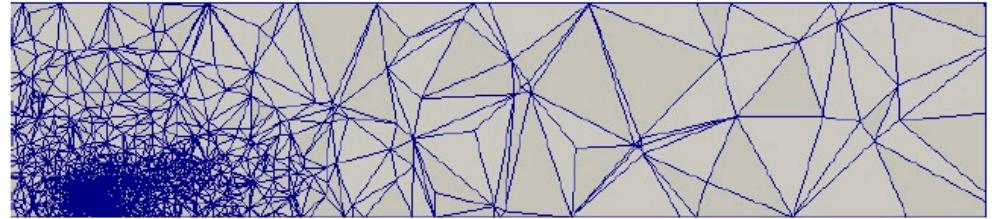
(e) $t = 3600\text{s}$

- Malla de referencia :

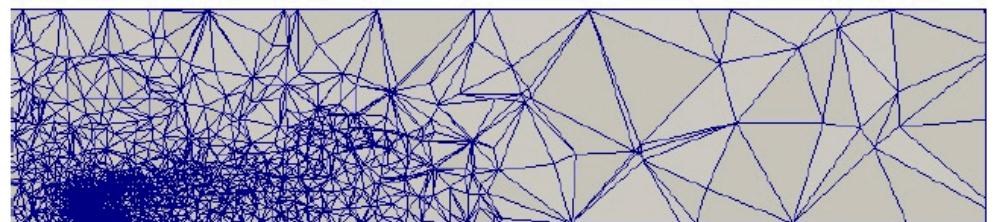


(a) $n_{elem} = 9600$

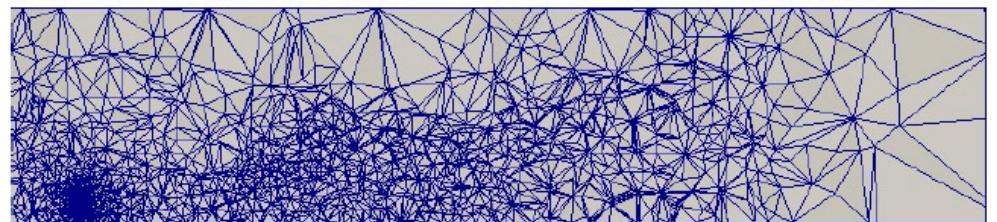
- **Mallas de cálculo:**



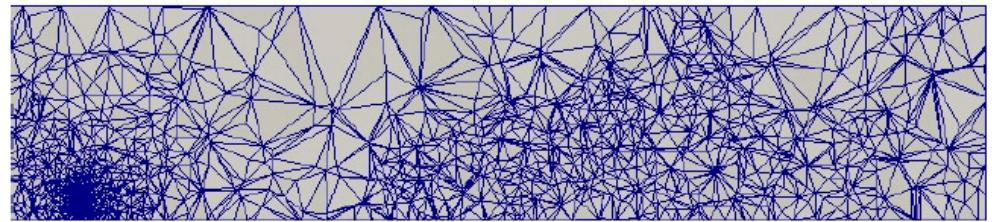
(c) $n_{elem} = 98452$, $t = 900\text{s}$



(e) $n_{elem} = 104475$, $t = 1800\text{s}$



(g) $n_{elem} = 65422$, $t = 2700\text{s}$



(i) $n_{elem} = 58690$, $t = 3600\text{s}$

Método multi-malla

- Esquema adaptativo multimalla. Aplicación para casos con diversas especies y modelos químicos no lineales.
- Resultados mejoran con el número de especies (modelo CB05)
- Monforte, Pérez-Foguet (2012), “A multi-mesh adaptive scheme for Air Quality Modeling with the Finite Element Method”, submitted to ECCOMAS Conference.

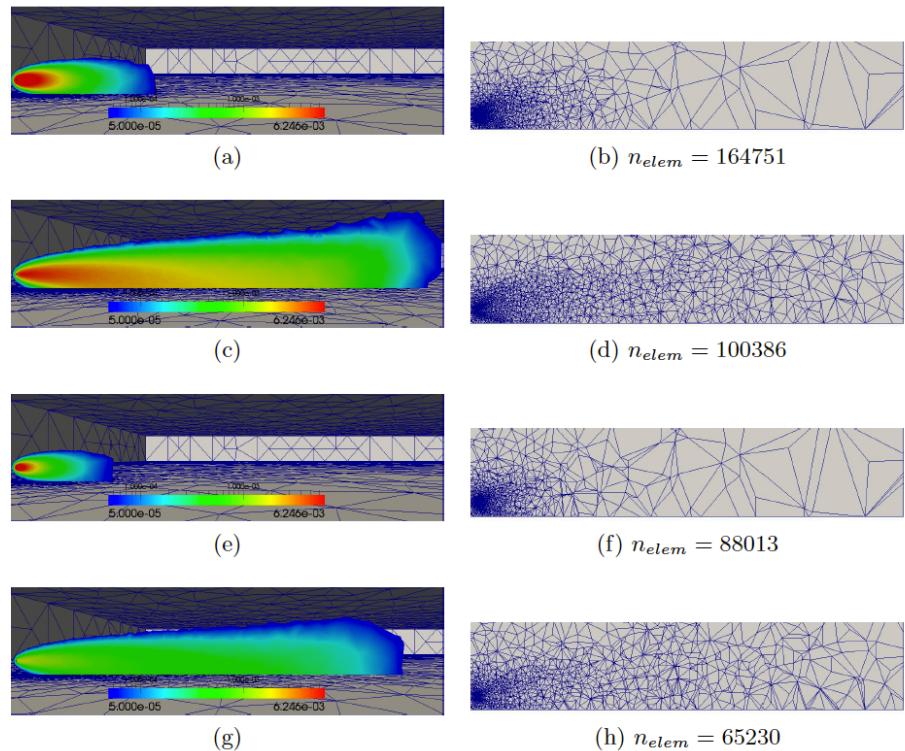


Figure 1: Solution and a cut of the mesh of the RIVAD model, at $t = 1800s$, of: (a) and (b) NO₂, (c) and (d) NO₃, (e) and (f) SO₂ and (g) and (h) SO₃