Permian inheritance: post-orogenic extension and metamorphic core complex formation (Western Pyrenees)

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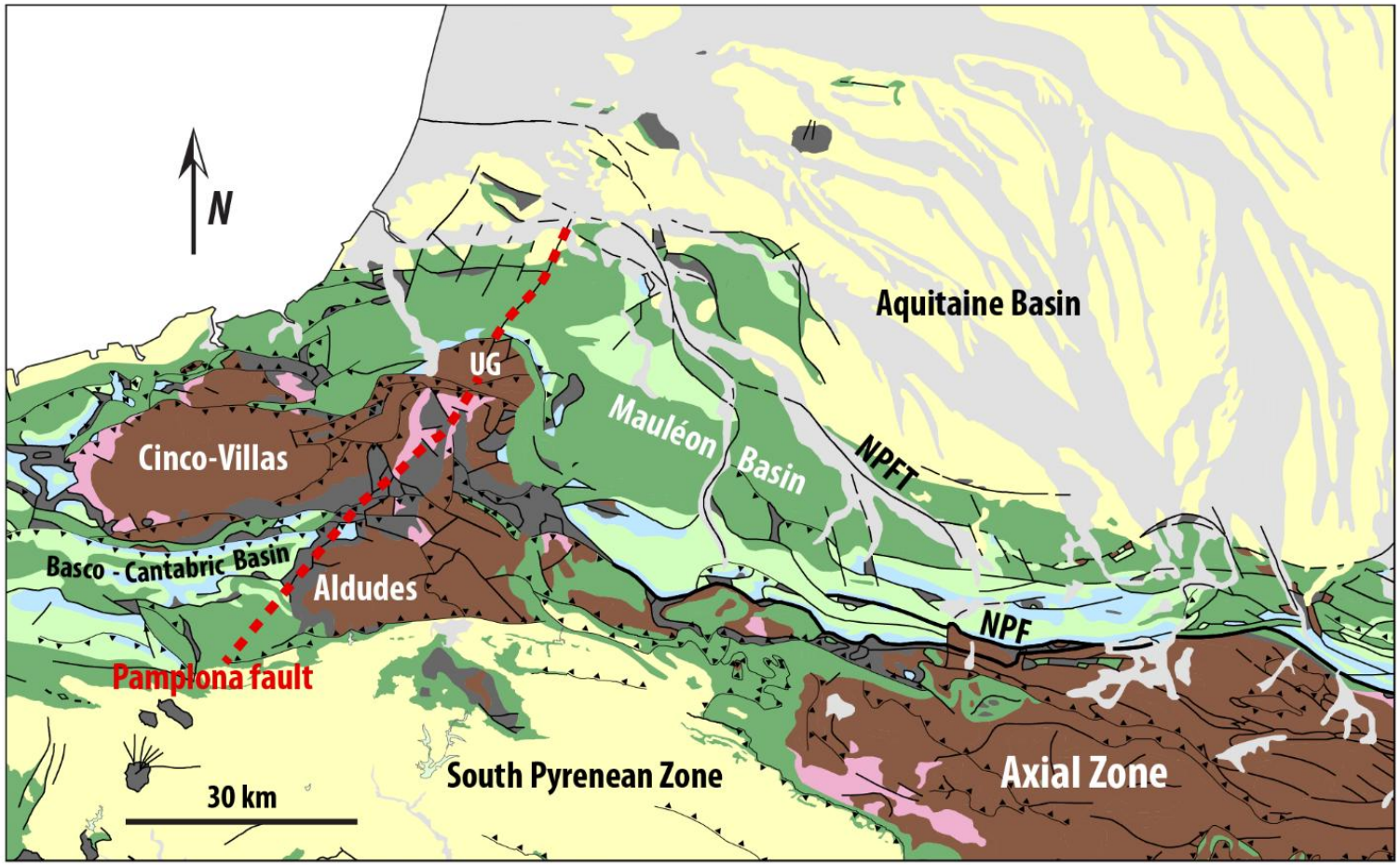
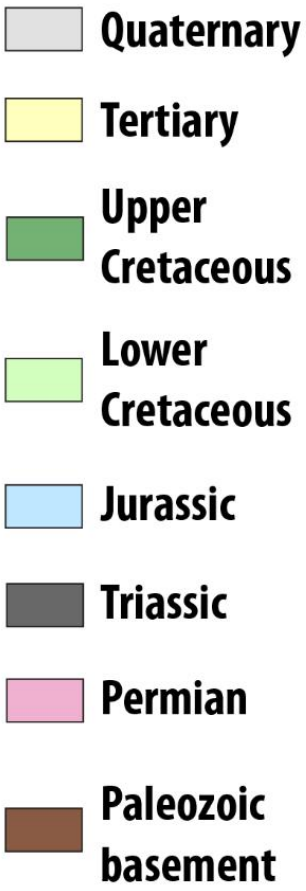
LOCATION MAP OF THE BIDARRAY BASIN





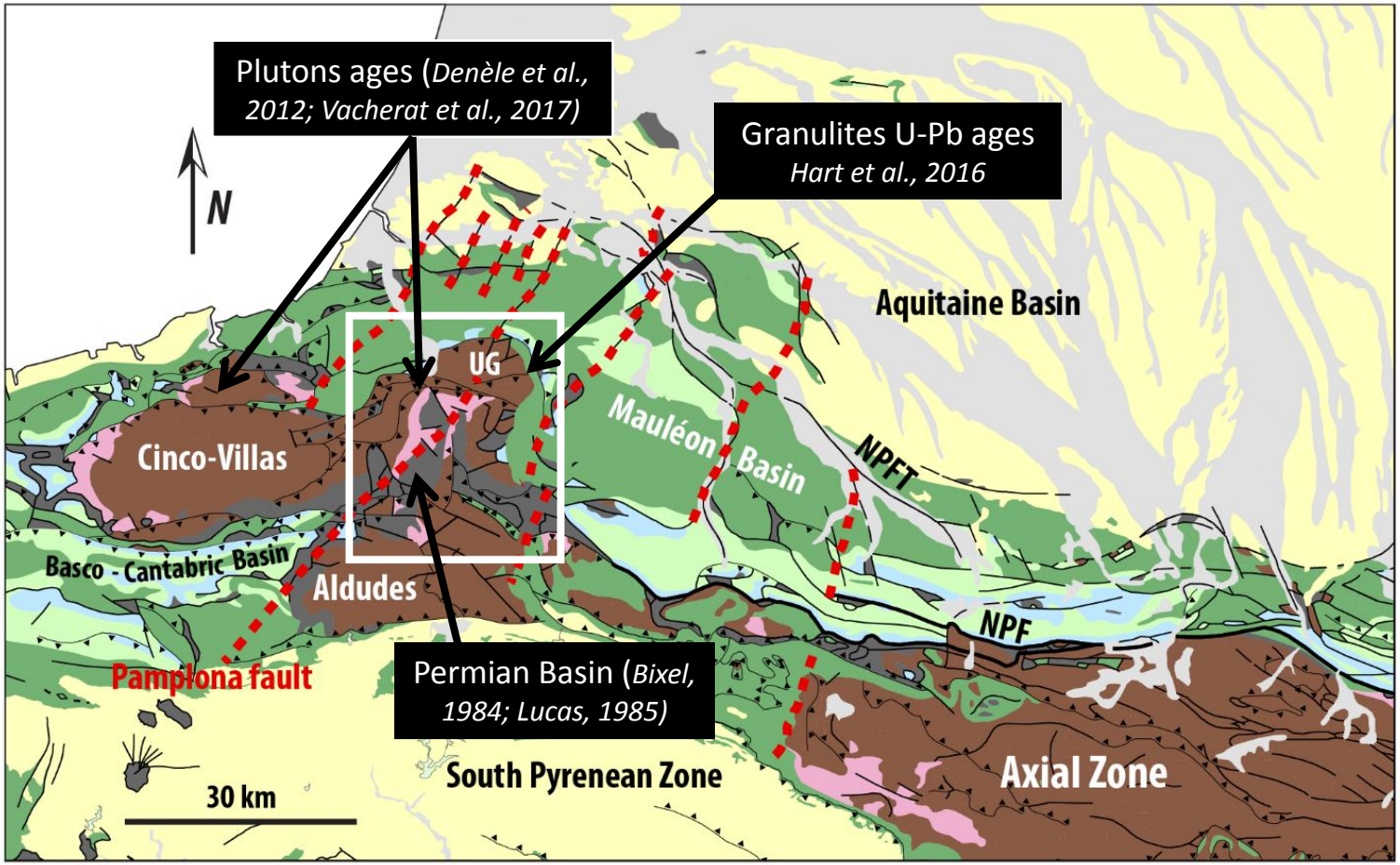
Pamplona N20° fault major structure interpreted as a **puzzle** of **Paleozoic blocks** (Muller and Roger., 1977)

Cinco-Villas → **European** paleo-magnetic affinity / **Aldudes** → **Iberian** Cretaceous **margin** (Schott., 1985)

Pamplona fault linked to **Permian Bidarray N20°** rift and **Ursuya granulites?**

What are the **process leading to** the **formation** of **this particular trend** of the **western Pyrenees?**

LOCATION MAP OF THE BIDARRAY BASIN



N20° Pamplona Fault is **not the only** one → **What geodynamical phase is responsible for the development of these N20° structures ?**

A single extensional tectonic phase between ca. **300** and **280 Ma**. is responsible for :

- **Granulites exhumation**
- **Plutons intrusions**
- **Permian** Bidarray **Basin** and **N20° structures**

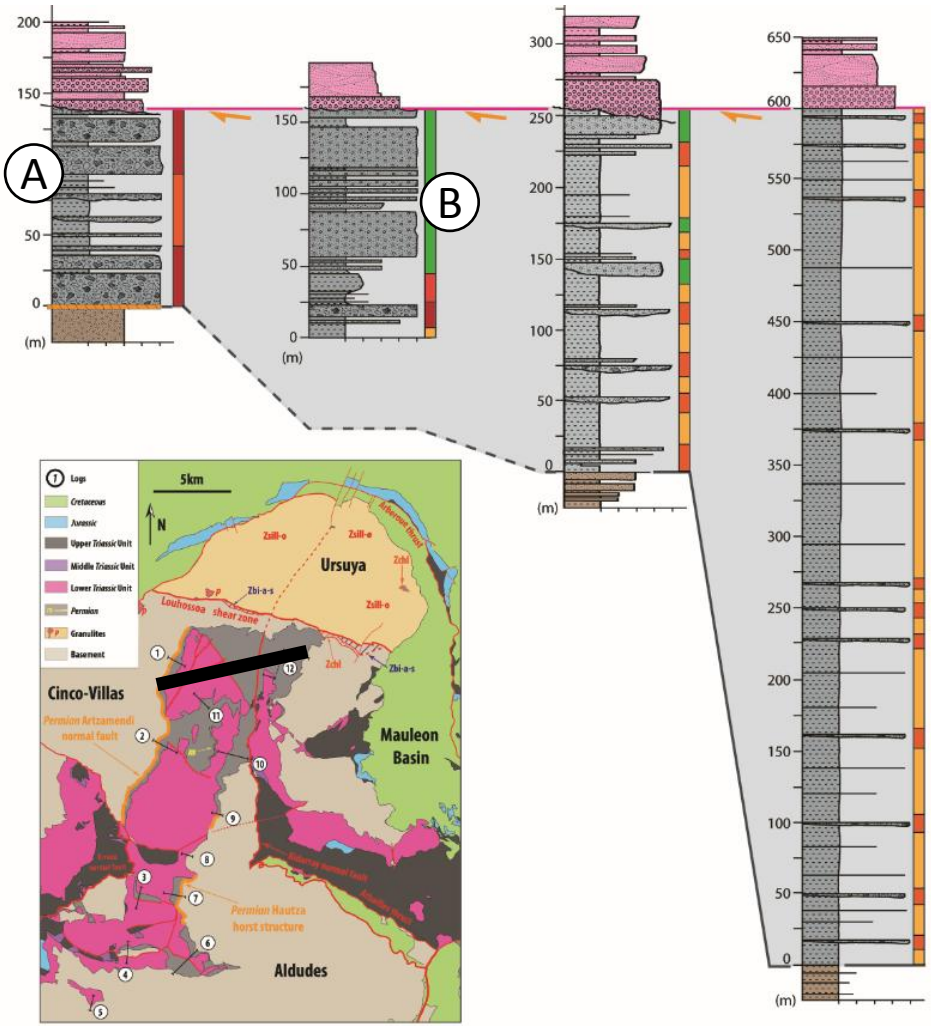
THICKNESS AND FACIES VARIATIONS ON THE BIDARRAY BASIN

No intra-Permian time line → paucity of stratigraphic markers inherent to red bed deposits

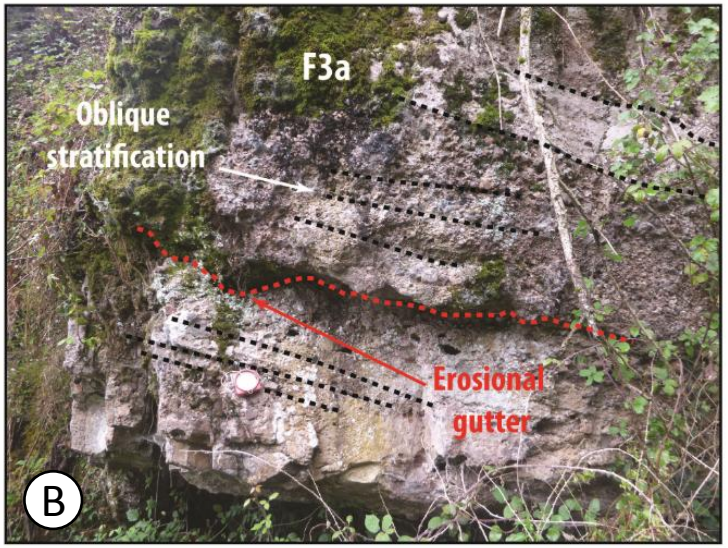
Base of Late Triassic conglomerates → datum for correlation

Eastward thickening of the Permian deposits

West **Est**



Fault-controlled hyper-concentrated alluvial **fans**



Longitudinal N-S braided fluvial system → **N170-200° paleo currents**

THICKNESS AND FACIES VARIATIONS ON THE BIDARRAY BASIN

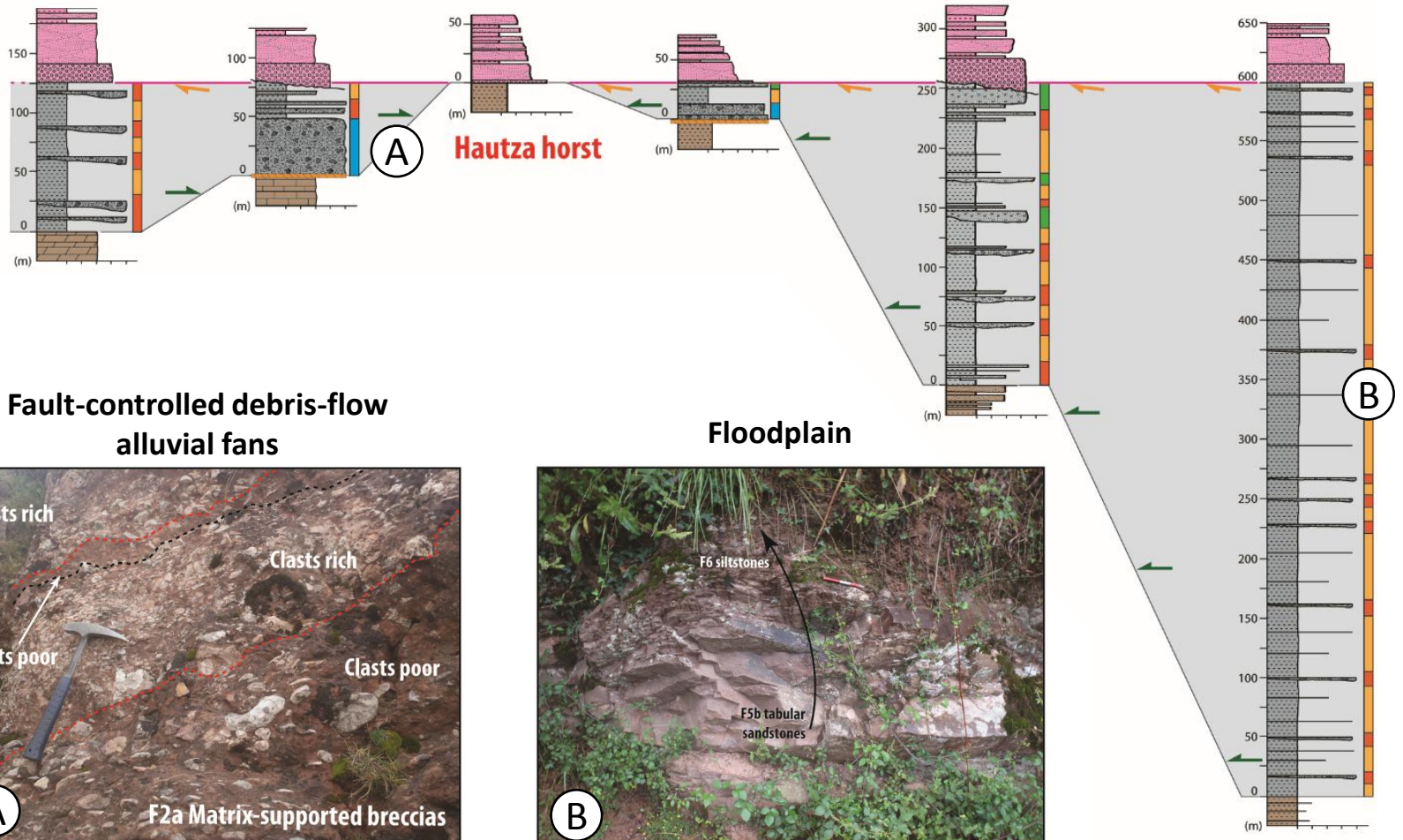
(1) Thinning of the Permian and Late Triassic deposits around the **Hautza horst**

(2) Thickening of the **Permian** sequence towards the **north**, at the **approach** of the Ursuya **granulites**

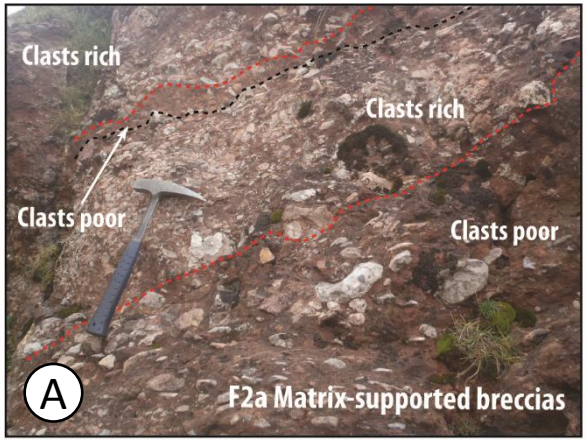
(3) Southward truncation of the **Permian** sequence **under** the **Triassic** deposits

South

North

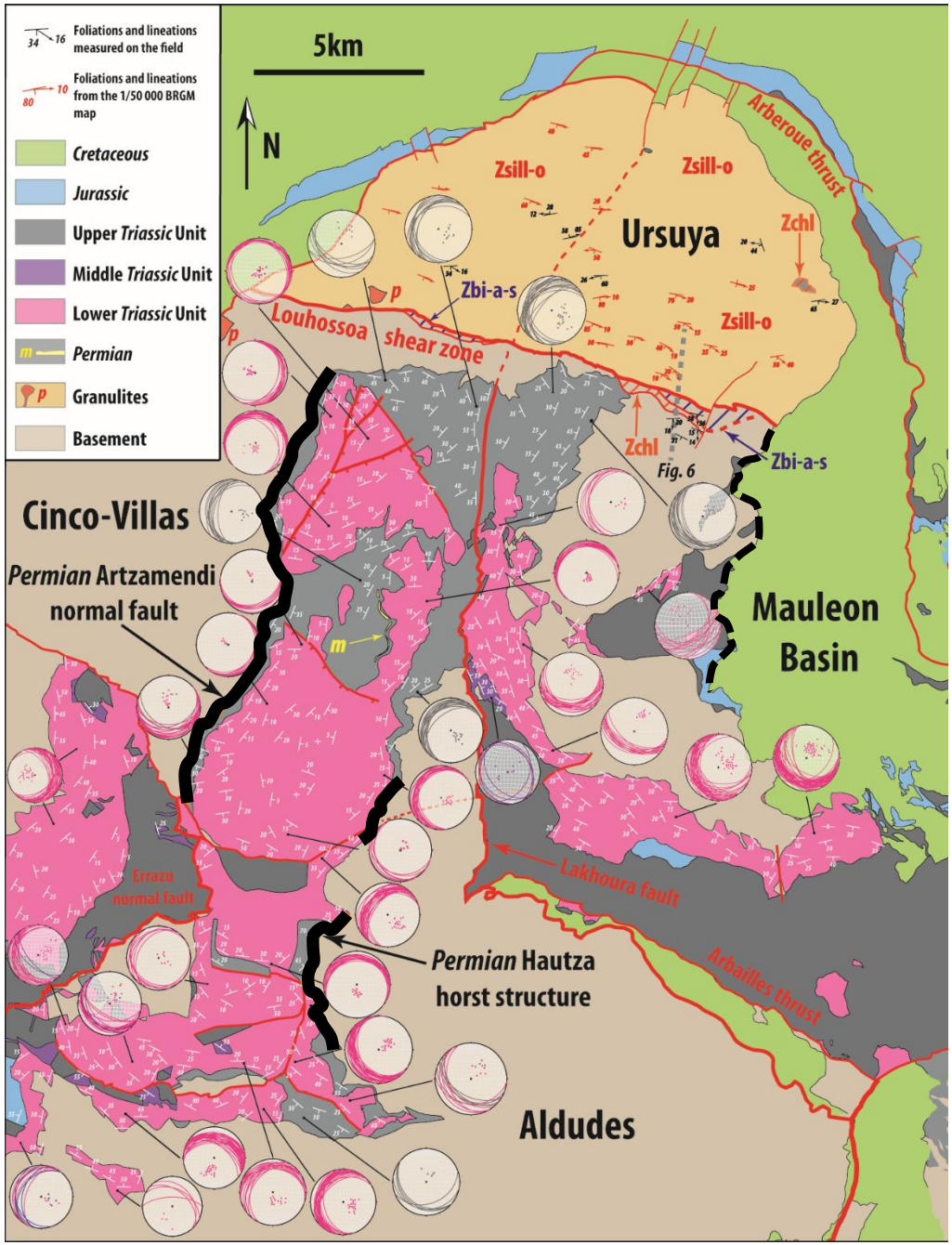


Fault-controlled debris-flow alluvial fans



Floodplain

CURRENT STRUCTURE OF THE SO-CALLED PAMPLONA FAULT-ZONE



Bidarray Basin:

Alluvial fans bordered by **N-S normal fault**

Massifs Basques Structural homogeneity

Ursuya dome:

E-W Stretching lineation → northern / central dome

Gneiss dome **regional extension** → **consistent** with **N-S** Bidarray **normal fault**

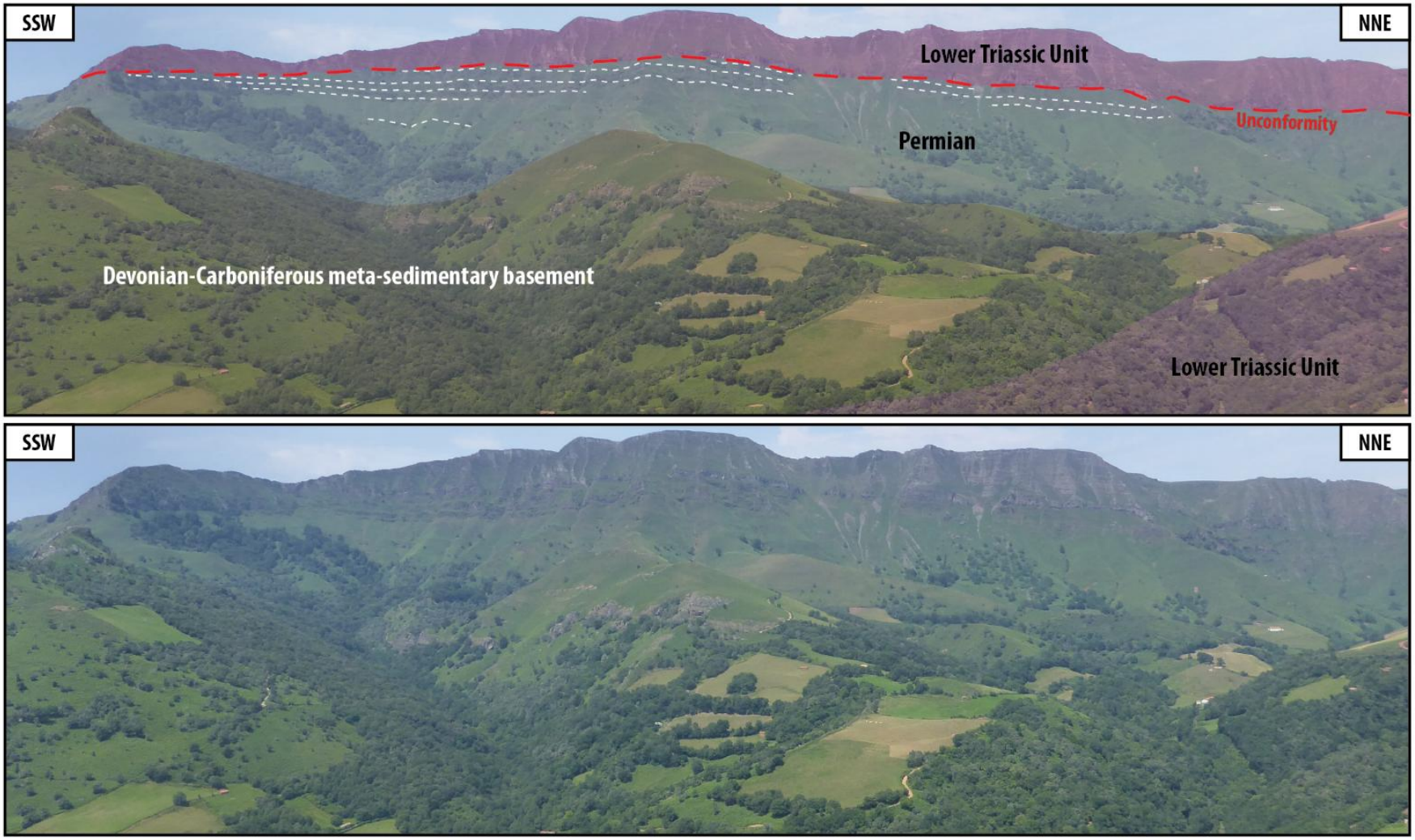
Southern dome → mineral-streching **lineations turn** to **N130°E** within **Louhossoa shear zone**

Louhossoa shear zone → **southward normal extension** during **Permian** times

PANORAMIC VIEW OF THE PERMIAN / LATE TRIASSIC UNCONFORMITY

E-W Louhossoa southward deeping **normal fault → NNE tilt** of the Permian Basin

- SSW thinning / truncation of Permian under Late Triassic continental deposits



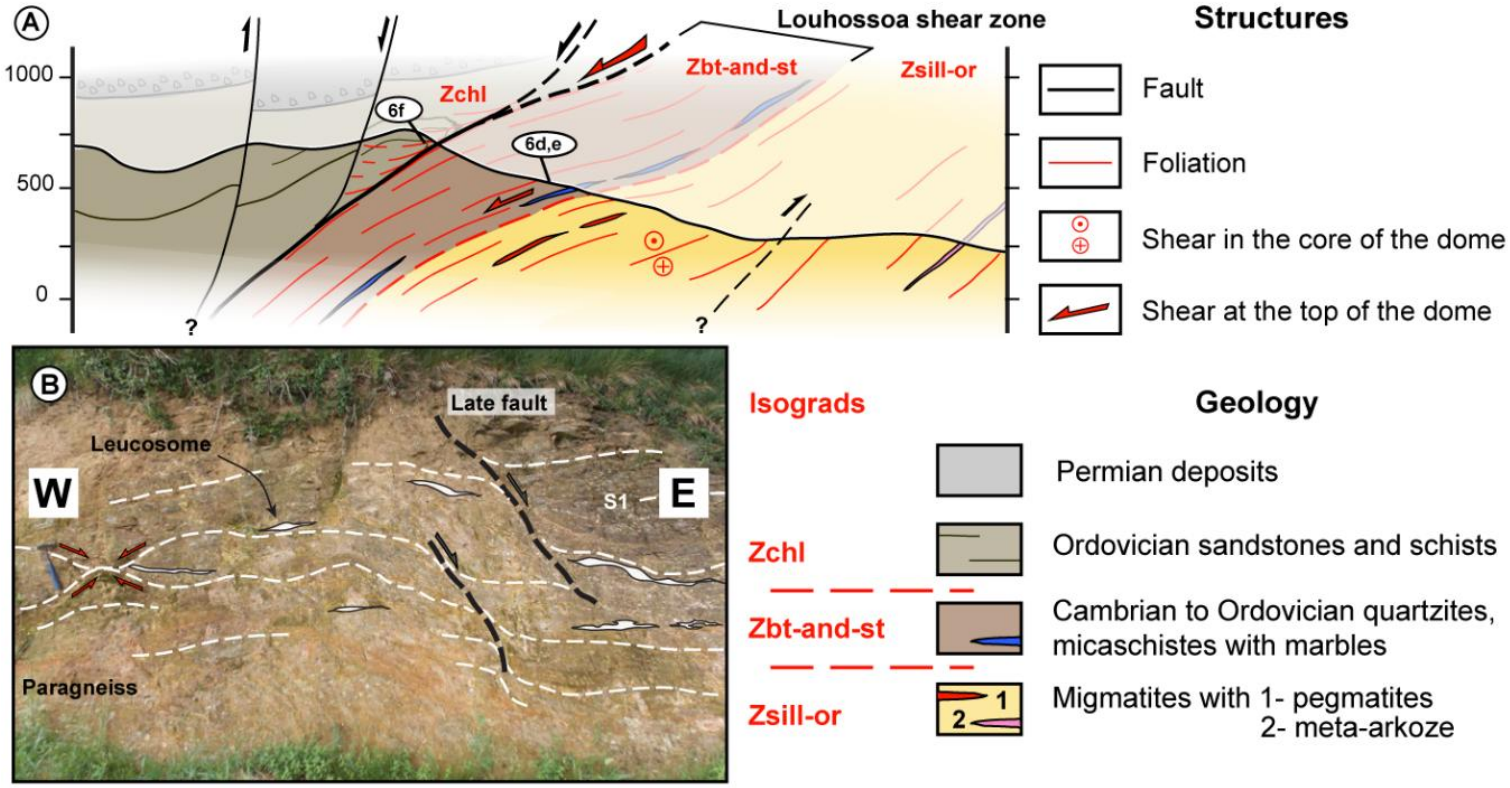
THE LOUHOSSOA SHEAR ZONE

(1) Ursuya gneiss dome → roughly south-dipping longitudinal foliation planes (B)

(2) High T°C deformation of **granulites/migmatites → high grade parageneses** / sillimanite and biotite

(3) South of gneiss dome: **migmatites** / **low-grade** Ordovician rocks (chlorite) **transition:** laminated paragneisses, micaschists and quartzites → **regional-scale *Louhossoa* E-W shear zone** (~ 500 m-thick, A)

(4) Single fabric from **high grade parageneses** to **chlorite** / **retrogressive deformation** within ***Louhossoa* shear zone → continuous exhumation during** a **single tectonic phase**



GEODYNAMICAL PERMIAN CRUSTAL THINNING CONCEPTUAL MODEL

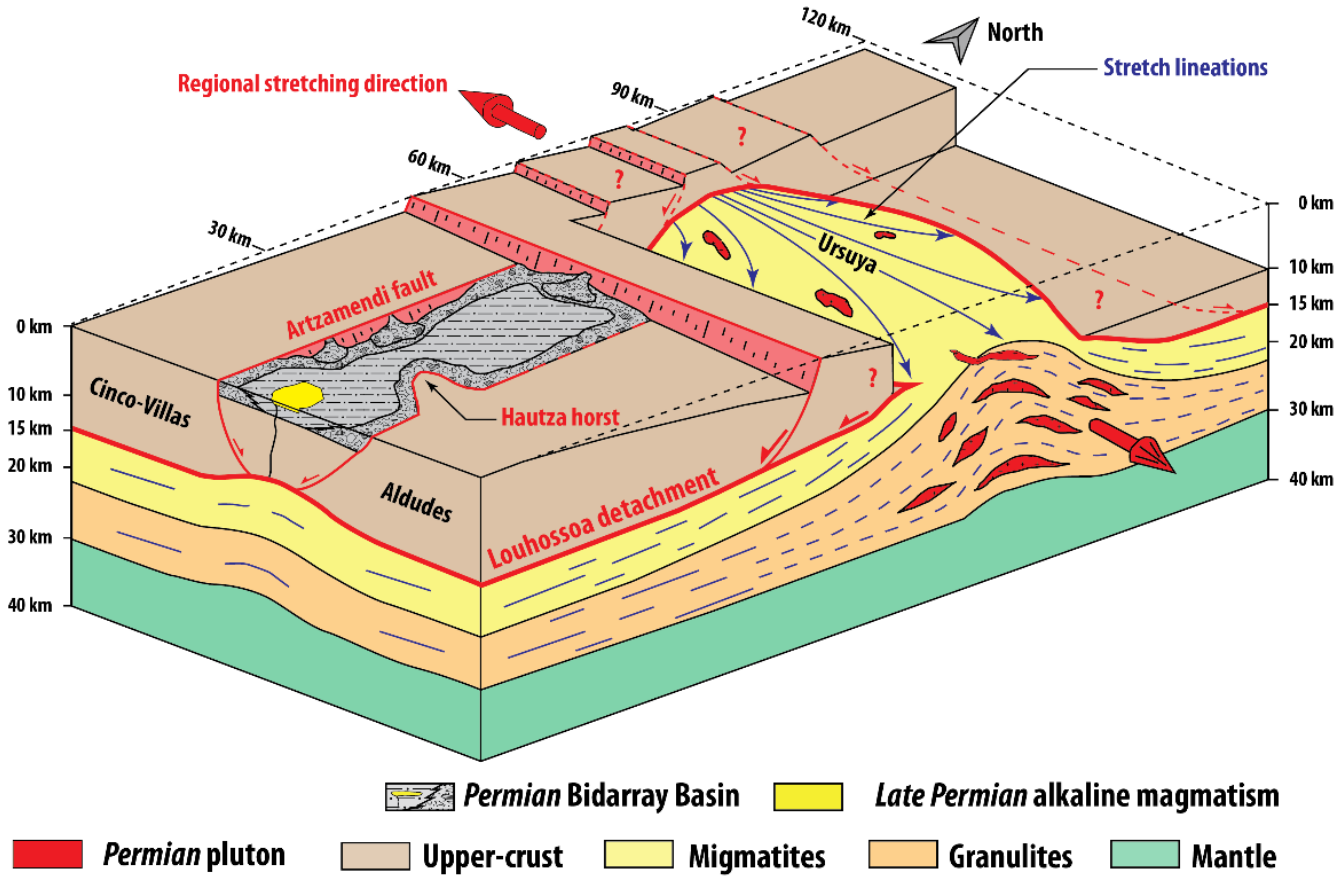
(1) N-S Bidarray narrow **graben** → part of a post-hercynian intracontinental rift

(2) Alluvial fans interdigitating with **N-S longitudinal fluvial system**

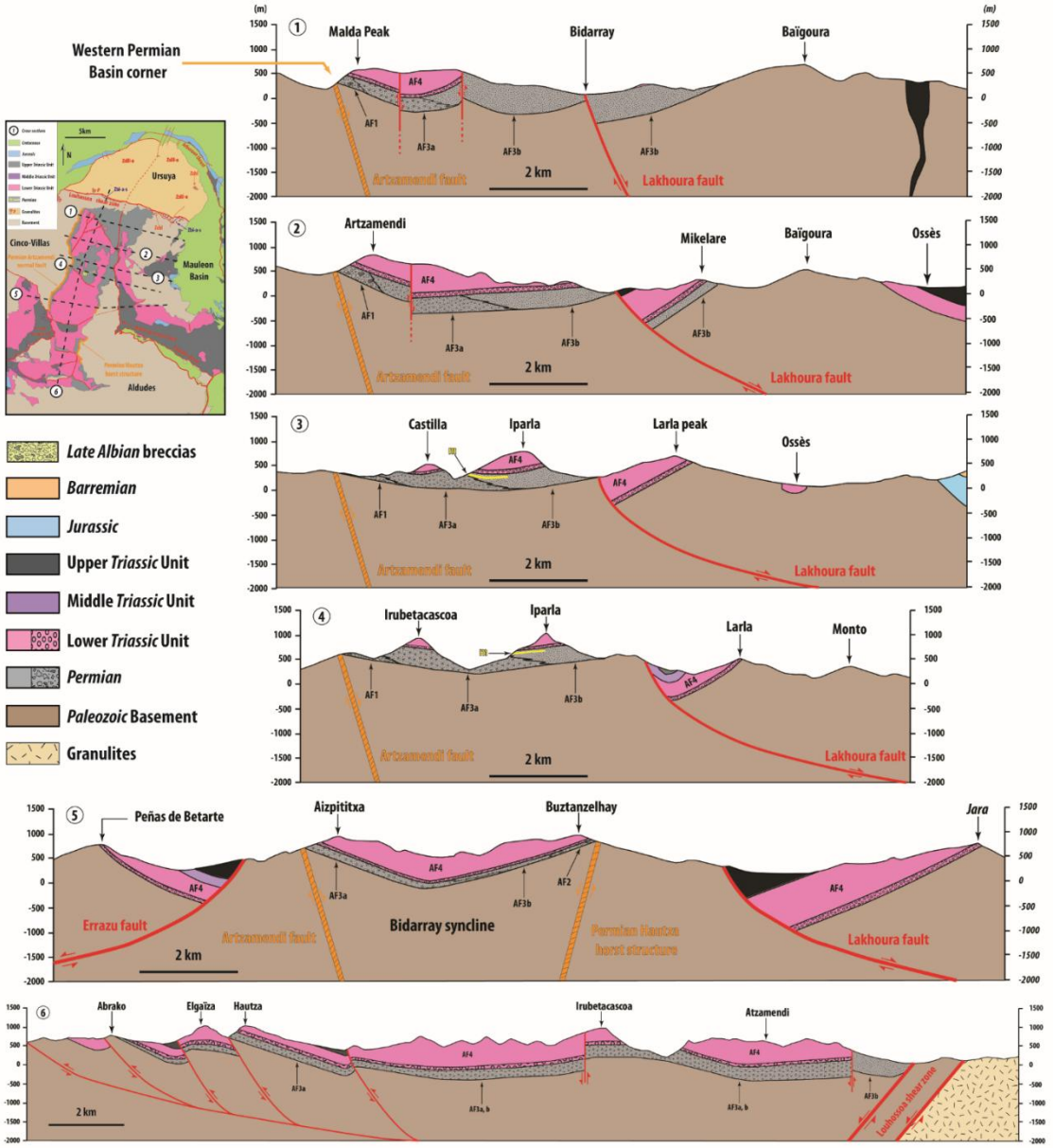
(3) Permian rift synchronous → granulitic metamorphism / EW crustal flowing within Ursuya dome

(4) Ursuya **dome**: **a-type** metamorphic **core complex → EW dome elongation** (i.e. parallel to regional extension) / progressive **stretching lineation divergence** within **EW Louhossoa** Permian **detachment**

(5) Ursuya granulitic → remnant body of a Carboniferous to Permian **MCC**



WHAT ABOUT THE PAMPLONA FAULT?



N20° Pamplona Permian inherited structure → MCC controlled N20° intra-continental **rift system**

Ursuya gneiss dome: **upper-crustal position** at the end of Permian times:

→ it's not a remnant body of the Early **Cretaceous hyper-extension**

Permian-Triassic paleogeographical and structural trends continuity

→ **absence** of **major alpine discontinuity** between *Cinco-Villas* of European paleo-magnetic affinity and *Aldudes* part of the northern-Iberian Cretaceous paleo-margin

No post-Permian **strike-slip motion of Iberia in this part of Pyrenees**