

Distribution of Iridium in Upper Triassic-Lower Jurassic continental strata of the Fundy, Deerfield and Hartford basins, Newark Supergroup

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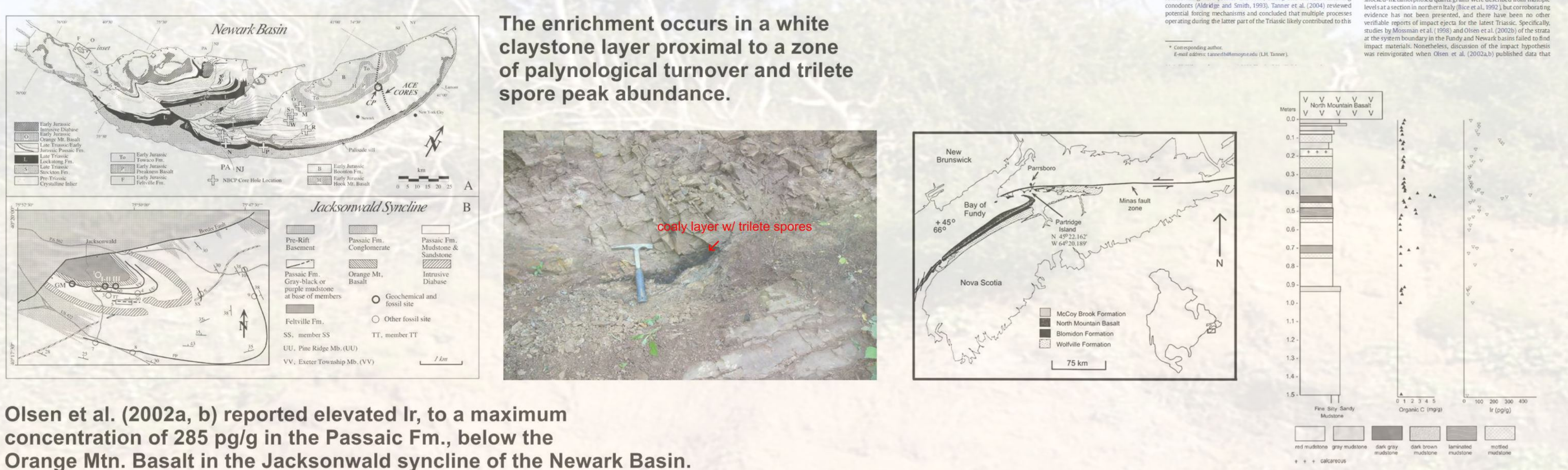
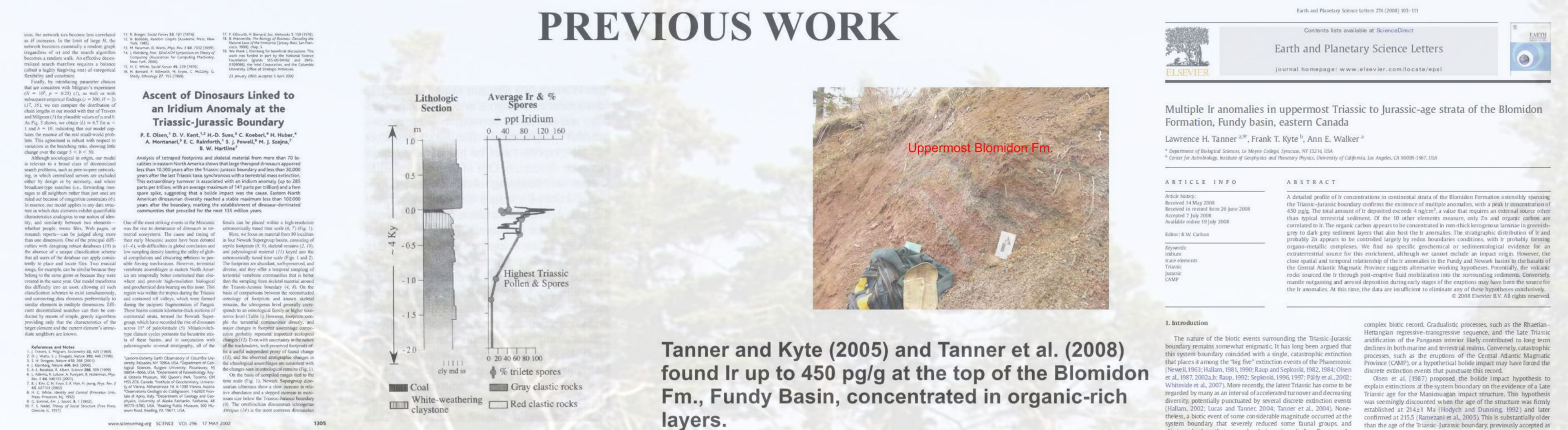
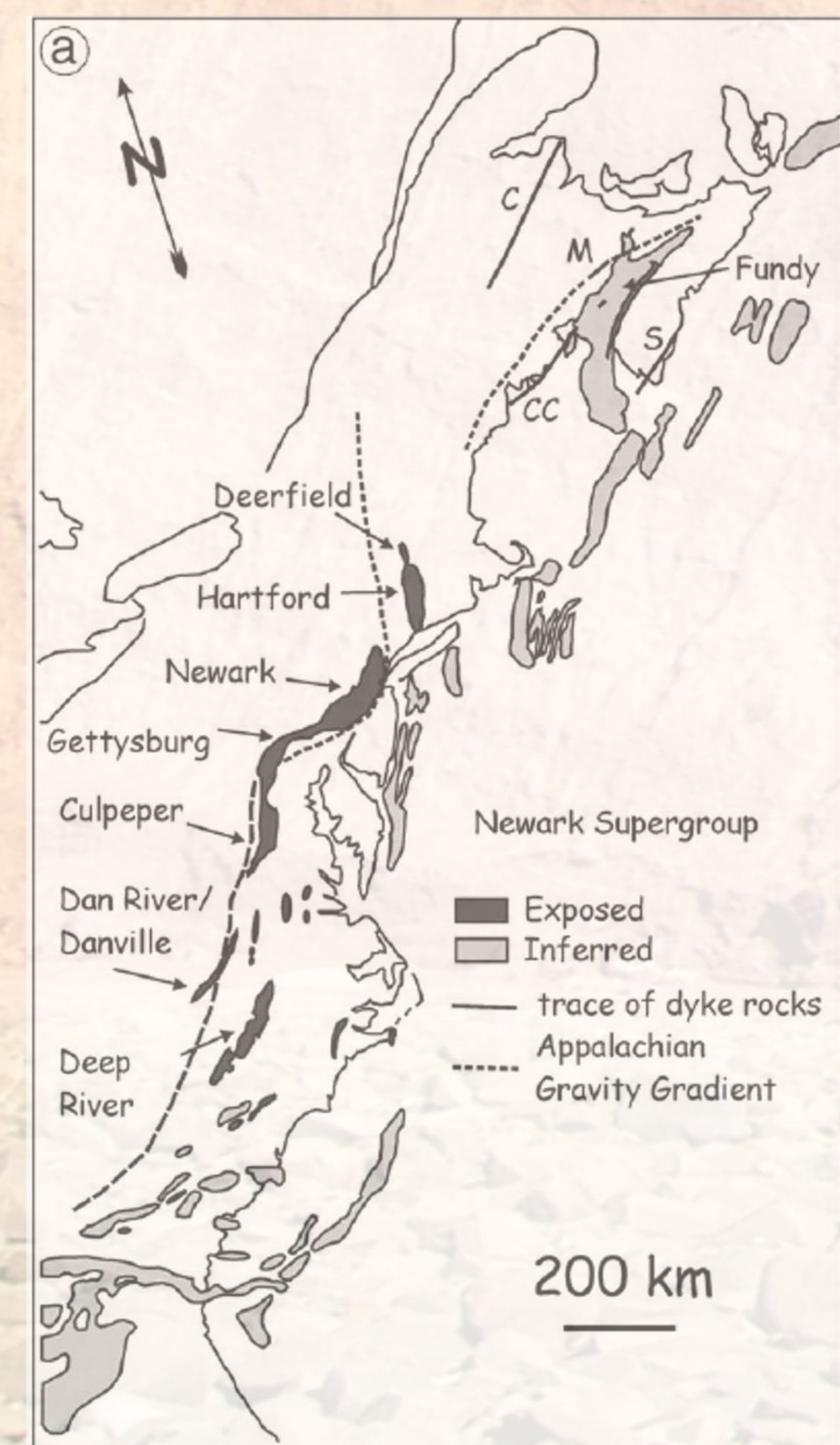
ABSTRACT

We report new data on the occurrence of Ir in strata of the Newark Supergroup basins. To date, elevated Ir levels in continental sediments proximal to the Triassic-Jurassic boundary (TJB) have been reported only from Upper Triassic strata of the Newark and Fundy basins, below the basal extrusions of the Central Atlantic Magmatic Province. Here we present the first report of the occurrence of elevated Ir above the oldest volcanic units, as well as additional horizons of Ir enrichment from other basins of the Newark Supergroup.

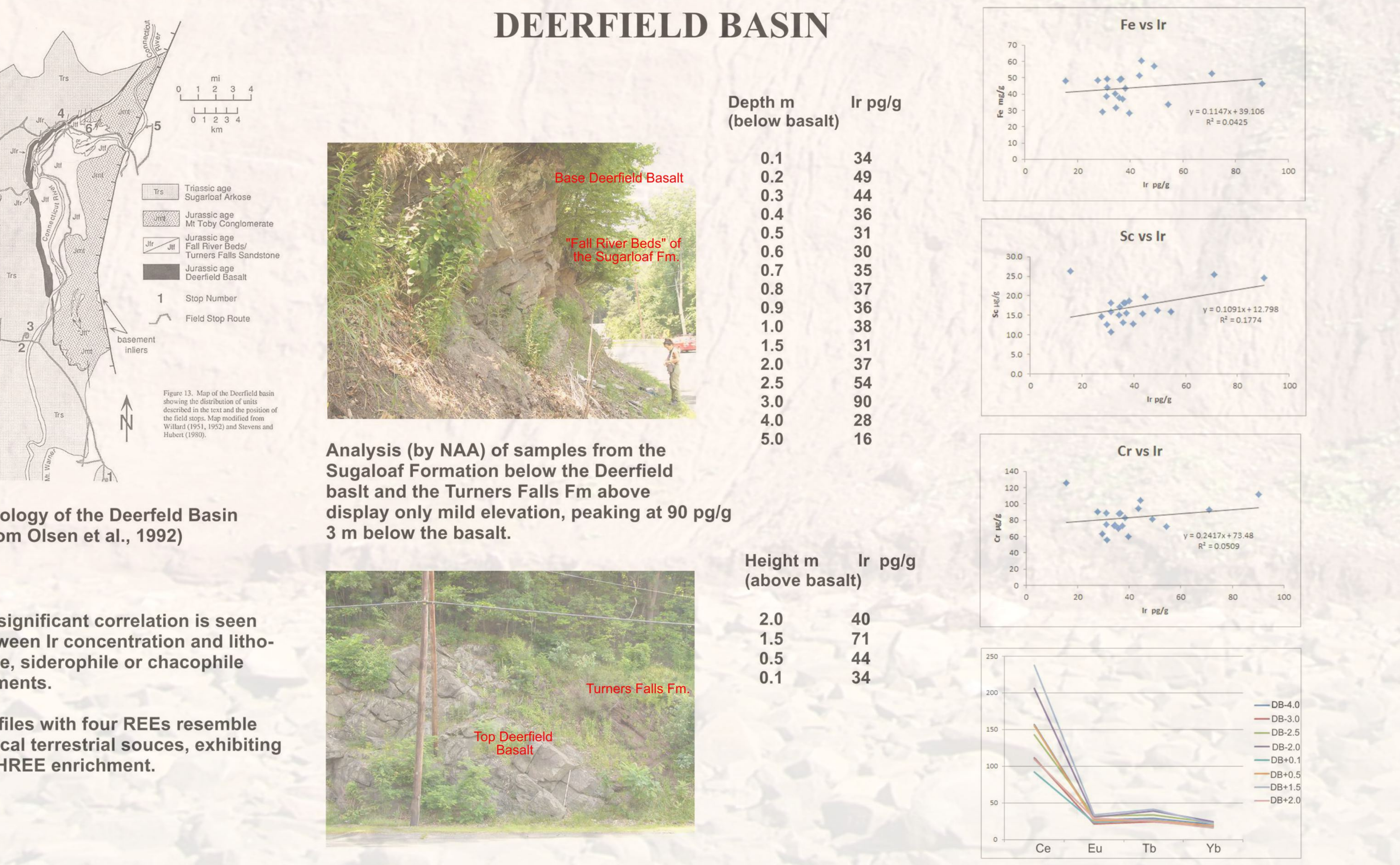
The uppermost New Haven Formation (Upper Triassic) at the Silver Ridge locality (Guilford, CT) in the Hartford Basin contains abundant plant debris, but no evidence of elevated Ir. At the *Clathropteris* locality to the north (Southampton, MA), potentially correlative strata that are fine grained and rich in plant remains have Ir enriched to 542 pg/g, an order of magnitude higher than in the coarser-grained strata in direct stratigraphic contact. The high-Ir beds also have elevated Rb, Yb and Ta relative to other Hartford Basin samples.

The Deerfield Basin (Massachusetts) is a structural extension of the Hartford Basin that contains only one CAMP extrusive unit, the Lower Jurassic Deerfield Basalt. Modest Ir enrichment, up to 90 pg/g, occurs in the Fall River Beds of the Sugarloaf Formation, several meters below the basalt, and up to 70 pg/g in the Turners Falls Formation less than 2 meters above the basalt.

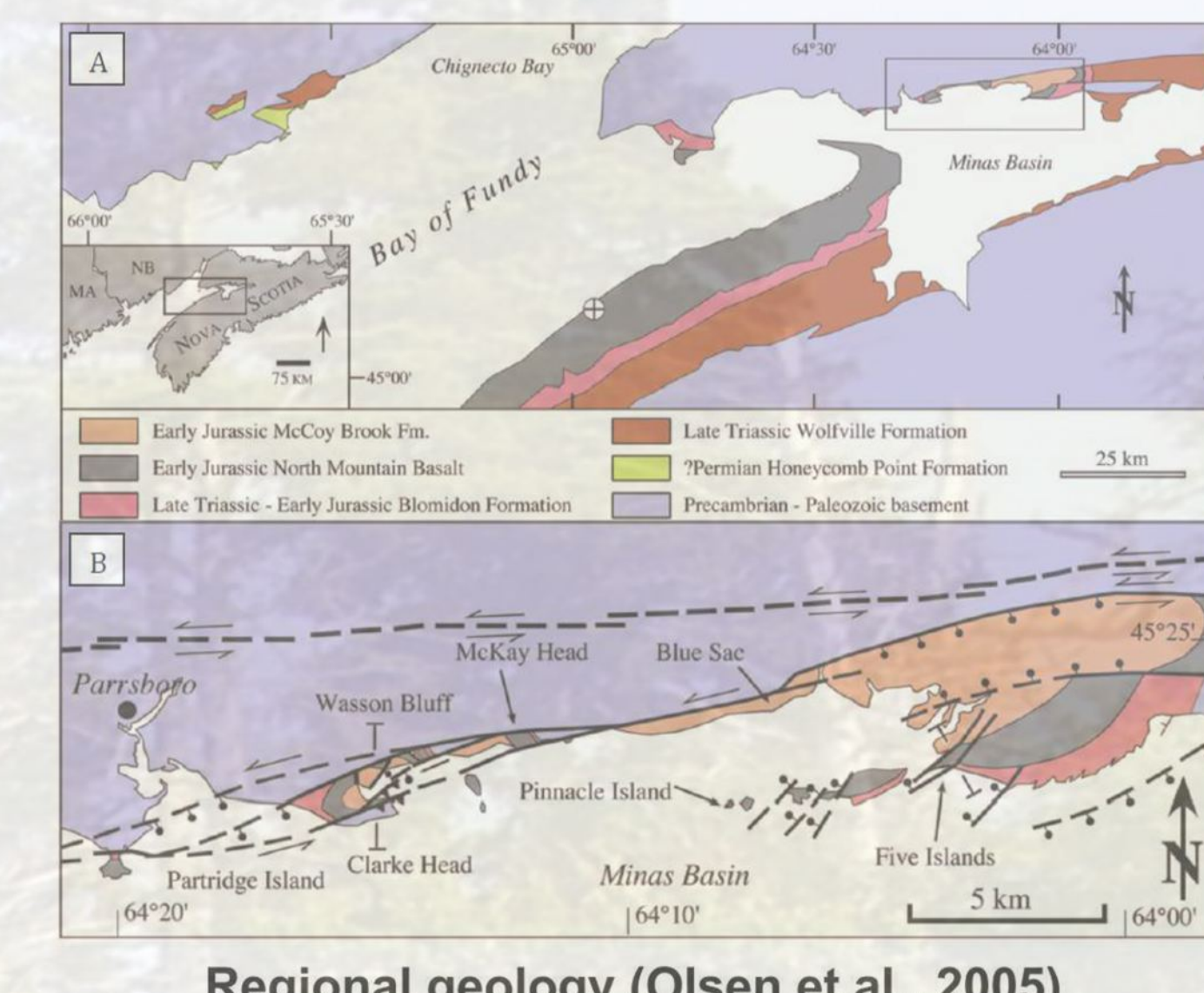
In the Fundy Basin (Nova Scotia, Canada), lacustrine sediments of the Scots Bay Member of the McCoy Brook Formation that directly overlie the North Mountain Basalt contain Ir up to 413 pg/g in fish-bearing strata very close to the palynological TJB. Higher in the formation the strata lack significant Ir enrichment. Sedimentary strata from between flows of North Mount Basalt show no Ir appreciable enrichment. We consider the basalts of the Central Atlantic Magmatic Province, widely accepted as the driver of Late Triassic extinctions, the origin of the elevated Ir levels in the Newark Supergroup, potentially through aerosol fallout.



Olsen et al. (2002a, b) reported elevated Ir, to a maximum concentration of 285 pg/g in the Passaic Fm., below the Orange Mtn. Basalt in the Jacksonwald syncline of the Newark Basin.



FUNDY BASIN - McCOY BROOK FM



Wasson Bluff lake bed
 Ir pg/g
 25 top
 21
 33
 43
 35
 47
 165
 410 base

The lake bed (with abundant fish debris) is basal McCoy Brook in direct contact with North Mtn Basalt. Ir enrichment in basal 10 cm.

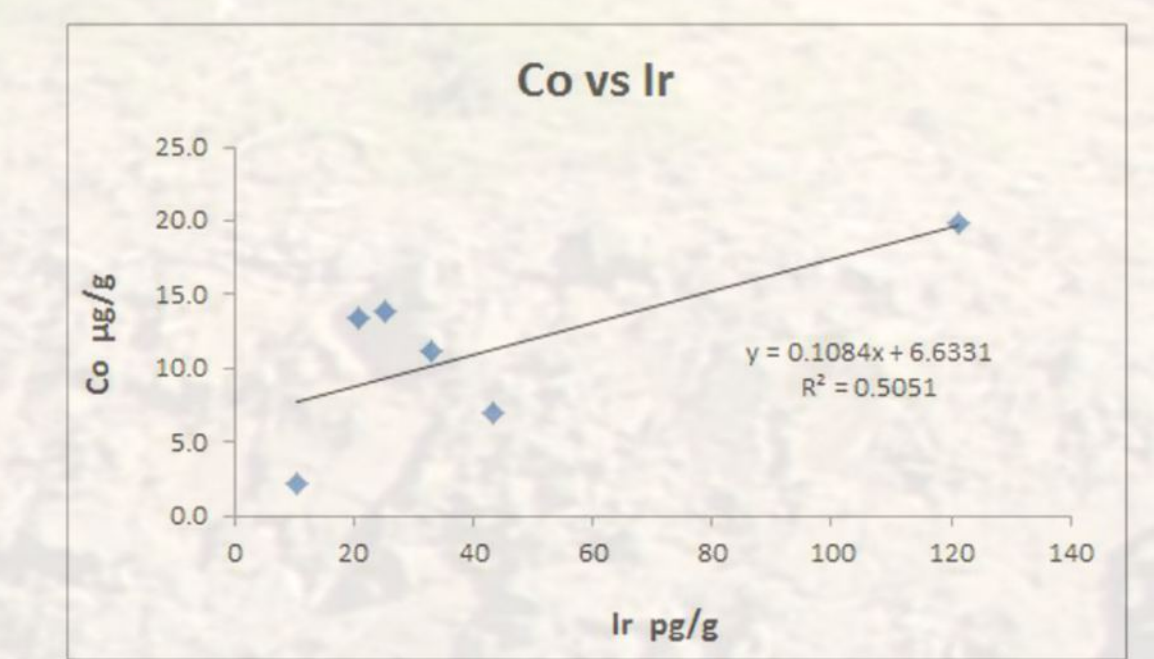
Regional geology (Olsen et al., 2005)



North Mountain Basalt near Wasson Bluff

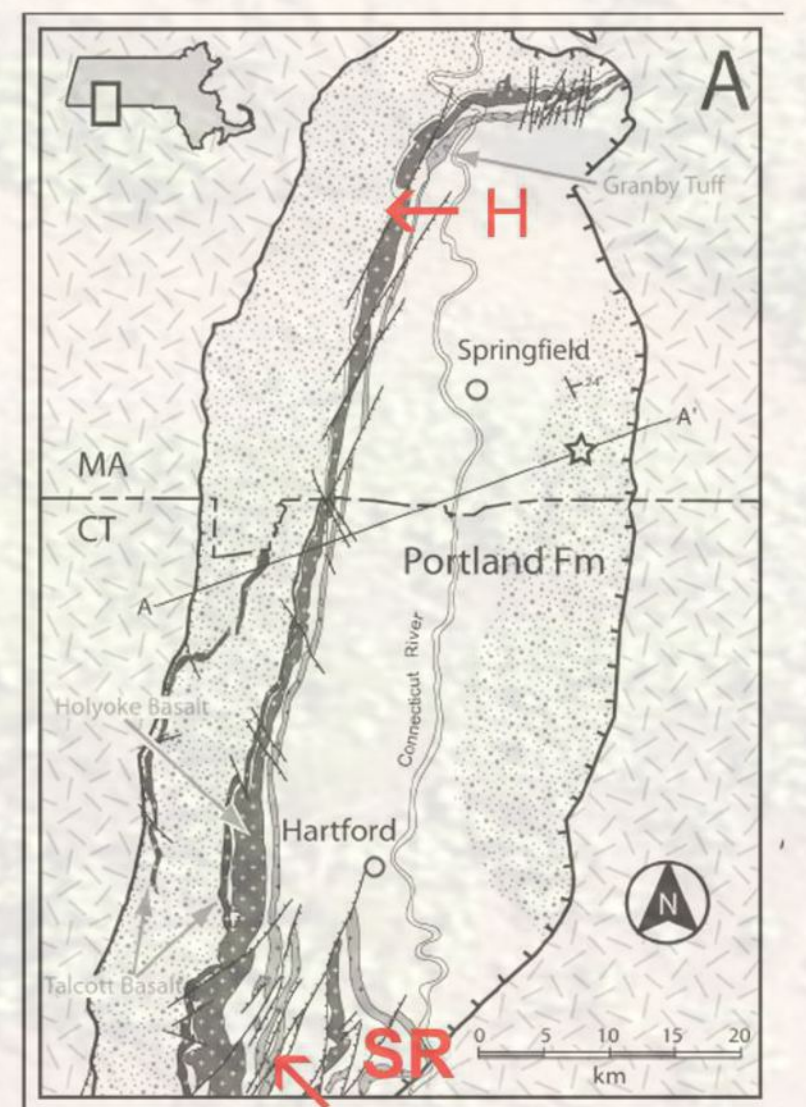


Samples higher in the section: eolian bed to the right = 11 pg/g lake bed in center = 121 pg/g



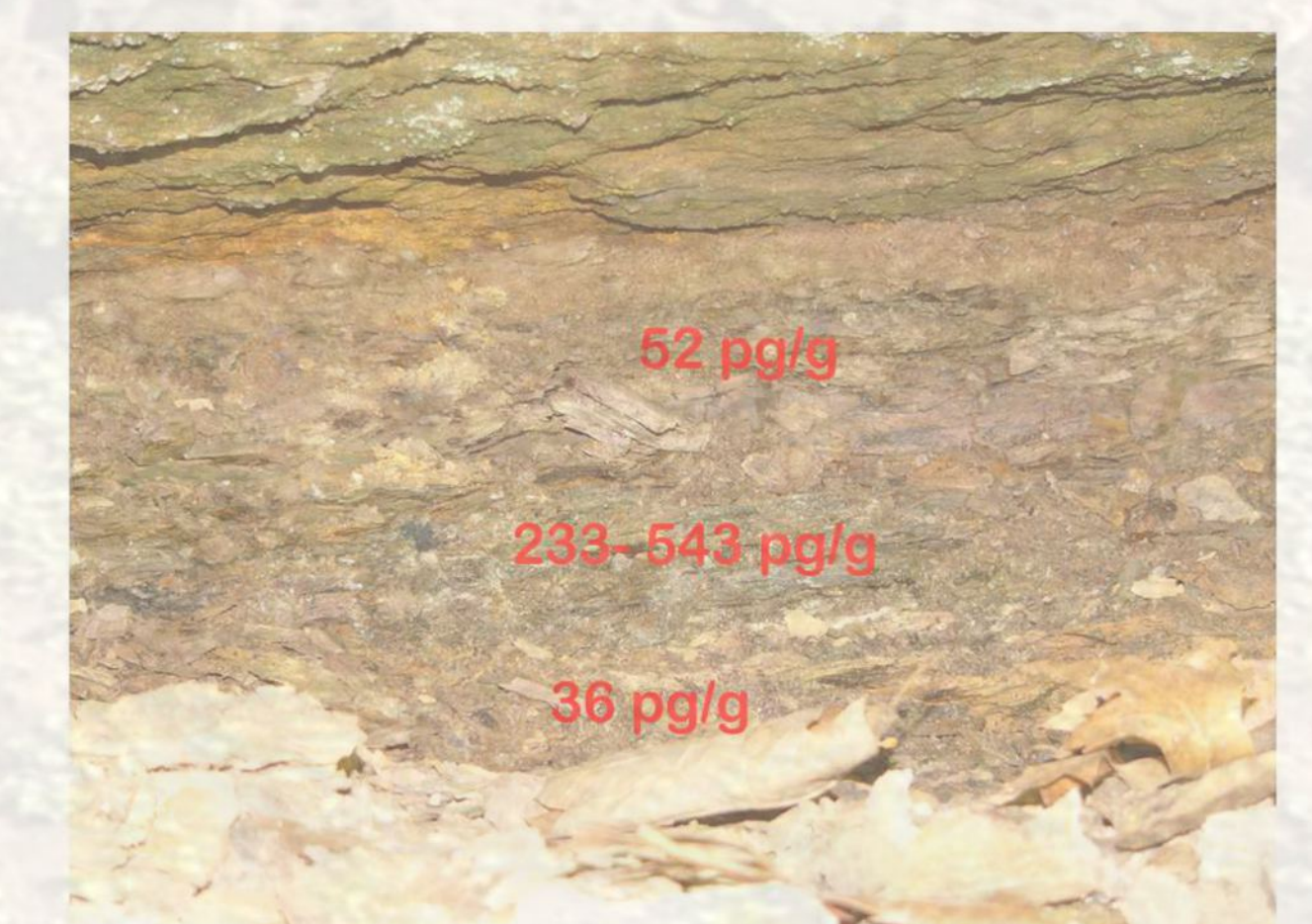
Co only siderophile that displays approximate correlation with Ir.

HARTFORD BASIN

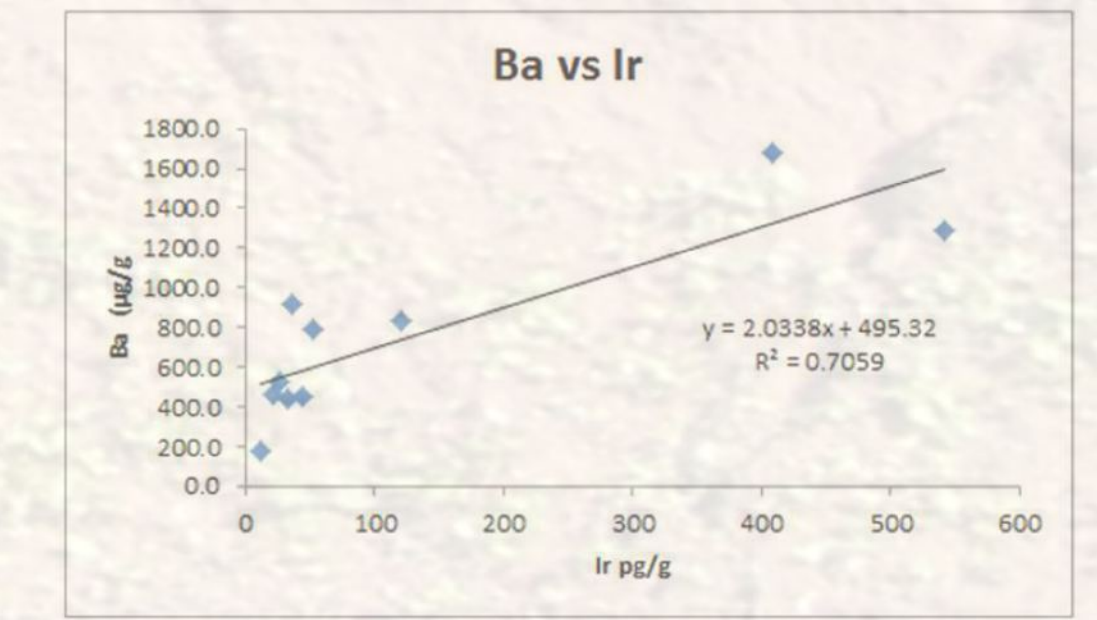


The Holyoke "*Clathropteris* locality" is a floating section that has been proposed as equivalent to the Silver Ridge locality, i.e., immediately below the Talcott Basalt, which is missing in the northern Hartford Basin. The ca. 8 cm fine-grained notch is micaceous and rich in plant remains.

Ir in the finest-grained layers = 233 to 543 pg/g
 Ir in the sandier layers encasing the finest grained layer = 36 to 52 pg/g



Sampling the uppermost New Haven formation below the Talcott Basalt at Silver Ridge. Ir = 33-39 pg/g.



Apparent correlation of Ir with Ba likely due to micaceous nature of the fine-grained sed and the affinity of Ba for micas and clays.

CONCLUSIONS

Tanner et al. (2008) hypothesized that Ir enrichment in the Blomidon Fm. (Fundy Basin) was sourced either directly from the overlying basalt sheet or from aerosol deposition. We tested this hypothesis by examining sedimentary formations in proximity to CAMP volcanics in other Newark Supergroup basins. Our results are as follows:

- 1) In the Fundy Basin, the basal lacustrine bed of the McCoy Brook Fm. is significantly enriched, with very slight enrichment in lake beds higher in the section;
- 2) The Deerfield Basin strata exhibit only slight Ir elevation above and below the basalt;
- 3) In the Hartford Basin, we expected Ir enrichment in beds just below the Talcott Basalt at Silver Ridge, but found none. The *Clathropteris* locality to the north, however, exhibited the highest Ir measured;
- 4) The source and mechanism of the enrichment in the Fundy, Hartford and Newark basins is still open to conjecture, but undoubtedly linked to CAMP volcanism.