

(Dendrochemistry)

(*Pinus eldarica*)

(*Pinus eldarica*)

:

(Cores)

(*Pinus eldarica*)

(*Zn*) (*Cu*) (*Ba*) (*Mn*) (*Pb*)



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(*Pinus eldarica*)

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(SO_2)

(CO)

(NO_x)

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t

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$$R_t = A_t + C_t + \delta D1_t + \delta D2_t + e_t ()$$

(Pb, Ba, Cu, Zn, Mn)

A_t, t

R_t

C_t

$D1_t$

$D2_t$

-
- 1- Graybill
 - 2- Cook

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- 1- *Platanus orientalis*
 - 2- Biotic
 - 3- Abiotic
 - 4- *Fraxinus excelsior*
 - 5- *Pinus eldarica*



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D2 D1

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D2 C

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D1 A

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(R²)

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$$Y_t = ae^{-bt} + K$$

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k b, a

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- 1-Growth trends
 - 2- Exponential
 - 3-Fit
 - 4-Coefficient of determination

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- 1- Dendrochronology
 - 2-Standardization
 - 3-Indices
 - 4-Auto Correlation



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(Cores)

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(Cores)

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(HNO3)

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(H₂O₂)

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(Ba) (Pb) (Cu) (Zn)

10X

ICP

(Mu)

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1-Cross dating

2- Dating

(

(Dendrochronology)

(Stuttgart)

(Achim Breuning)

1-Deionized water

2-Inductively coupled plasma spectroscopy

3-Sequential



(Pinus eldarica)

	(M)			pH			
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Archive of SID

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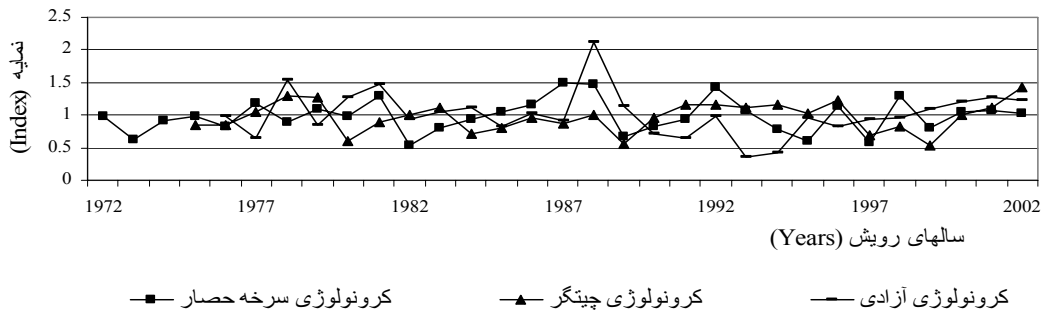
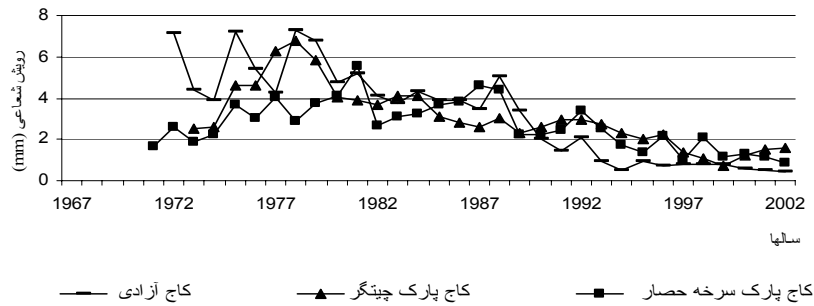
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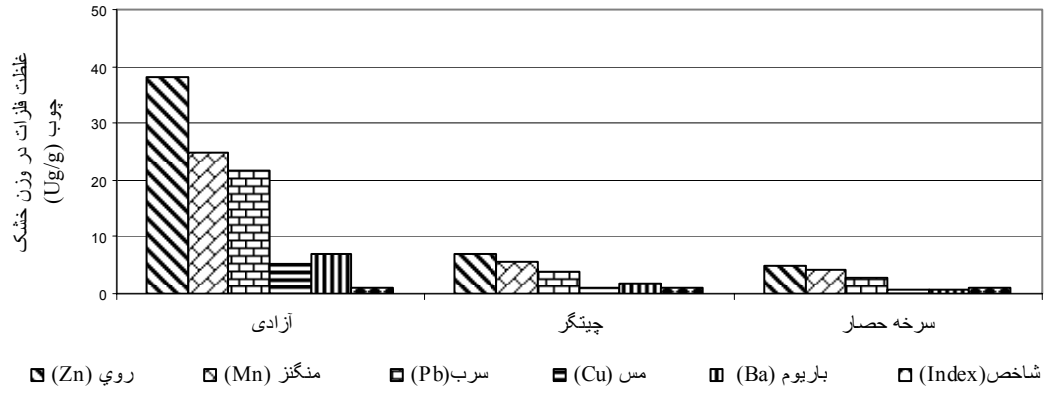
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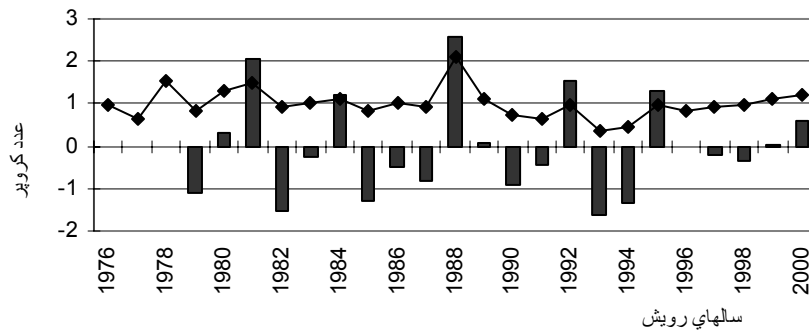
MSTATC

1-False ring

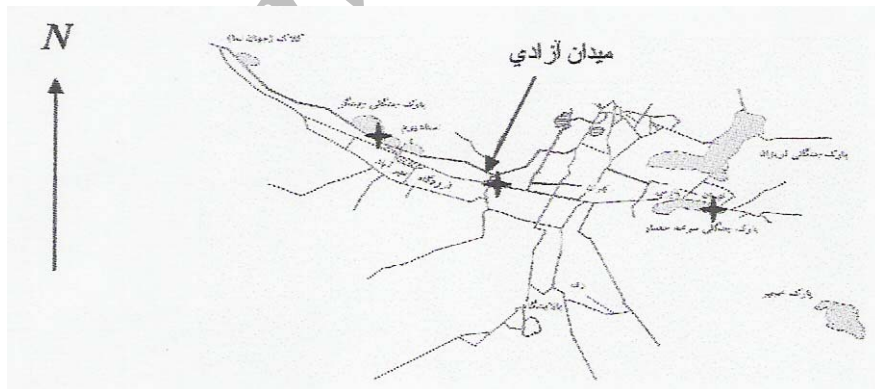




(Cu) (Pb) (Pb) (Mn) (Zn)

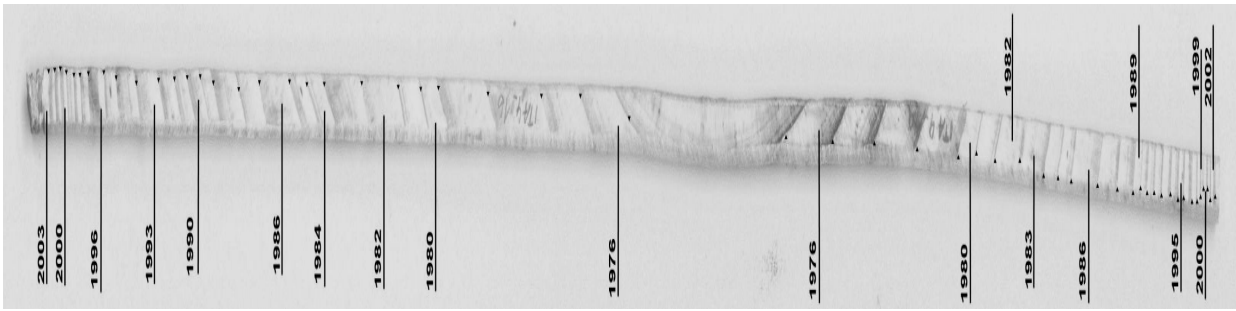


عدد کروپر کرو نولوژي کاج آزادي



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(*Pinus eldarica*)

				F
(A)		/	/	< ns
(B)		/	/	< ns
(A*B)		/	/	< ns
		/	/	

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				F
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()		/	/	/ **
()		/	/	
		/		

1-Coefficient of variation



<u>MS</u>											
(Block)	γ	*	/	/	**	/	**	/	**	/	**
(Treat)	ε	/	ns	/	**	/	ns	/	ns	/	ns
(Error)	λ	/	/	/	/	/	/	/	/	/	/
C.V()		/	/	/	/	/	/	/	/	/	/

ns % * % **

	(Pb)	(Ba)	(Cu)	(Zn)	(Mn)
(Index)	/	/	/	/ **	/

% **

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	/ (A)
	/ (B)
	/ (B)
	/ (B)
	/ (B)

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MSTATC

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1-Complete randomized block design
2-Duncan multiple range test



(Pinus eldarica)

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(Fraxinus

excelsior)

(pb)

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Agum Breuning

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Margaret Devall

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Archive of SID

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1-Stuttgart university
2-Agriculture forest service, Stoneville



(Dendrochronology)

(*Fraxinus excelsior*)

(*Juniperus polycarpus*)

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(Dendrochronology)

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(*Fraxinus excelsior* & *Pinus eldarica*)

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