

17th and Early 19th-Century Practices of Grassland Management and Use in the Julian Alps

*Exploring Alpine Landscapes as Potential Agricultural Heritage
Systems and Their Contribution to Human Wellbeing,
7th September 2017*

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*results mainly based on a postdoctoral grant by the Austrian
Academy of Sciences at the Institute of Social Ecology, Vienna
(hosted by Verena Winiwarter)*

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SPECIES-RICH SEMI-NATURAL GRASSLANDS

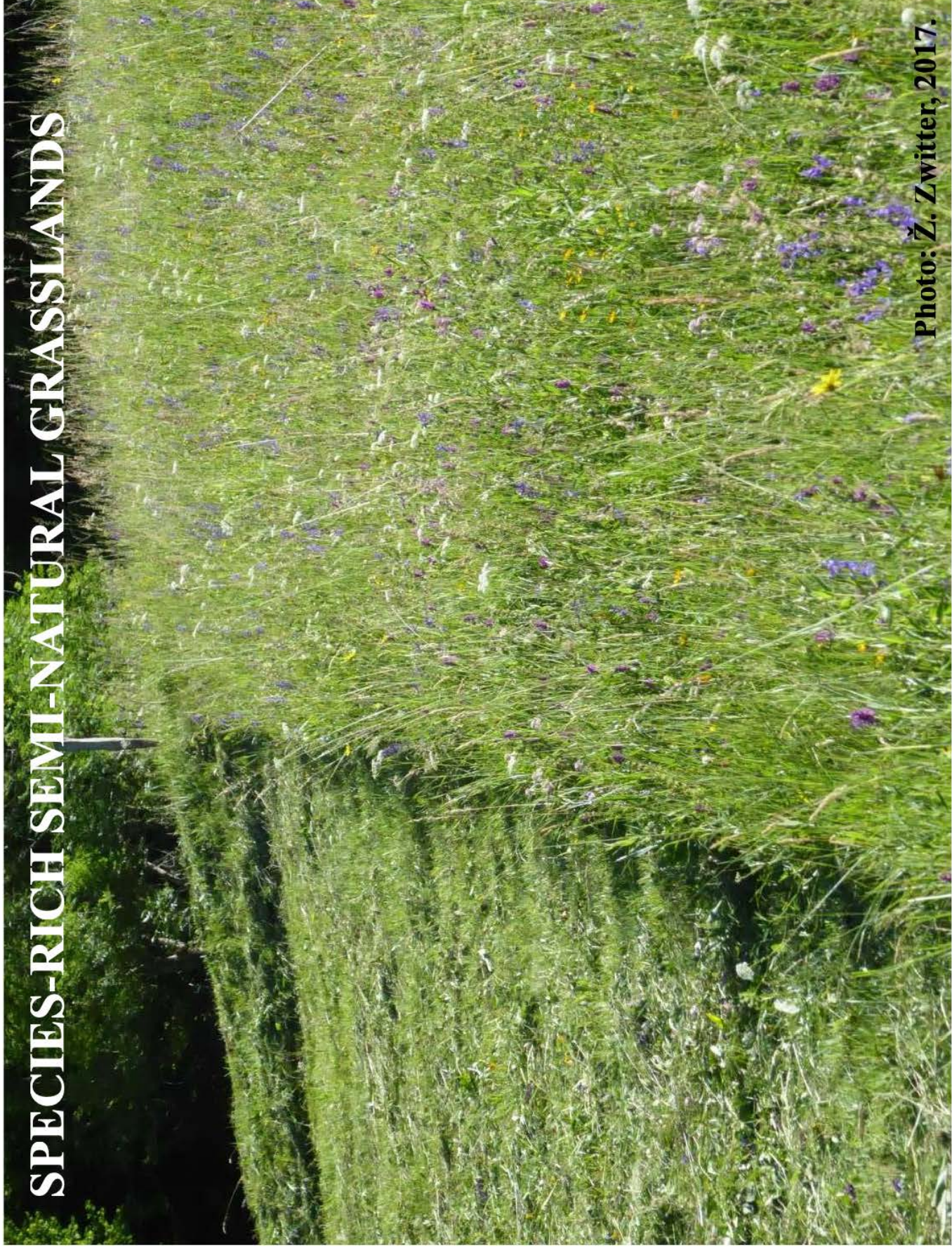
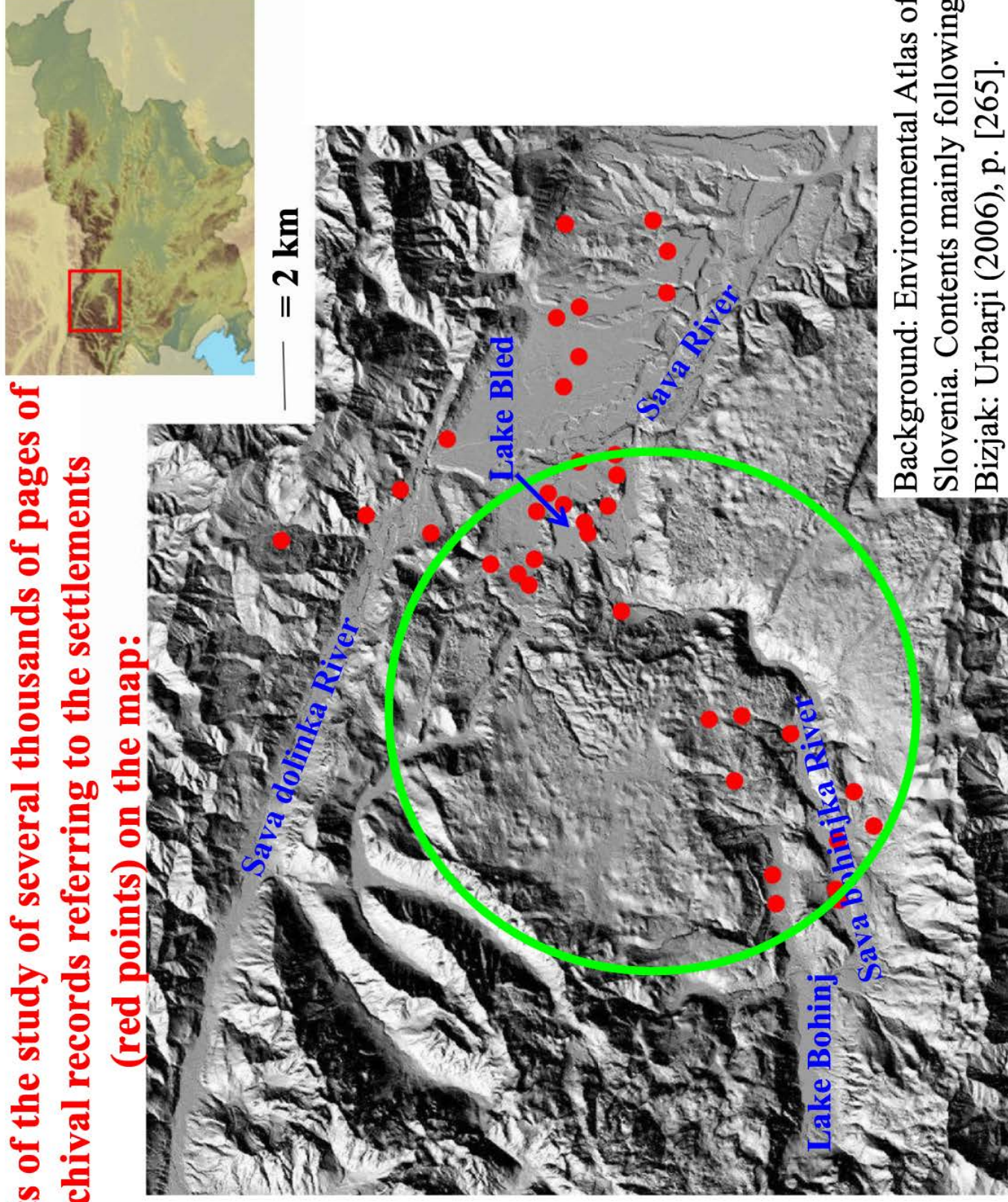


Photo: Ž. Zwitter, 2017.

Results of the study of several thousands of pages of archival records referring to the settlements (red points) on the map:

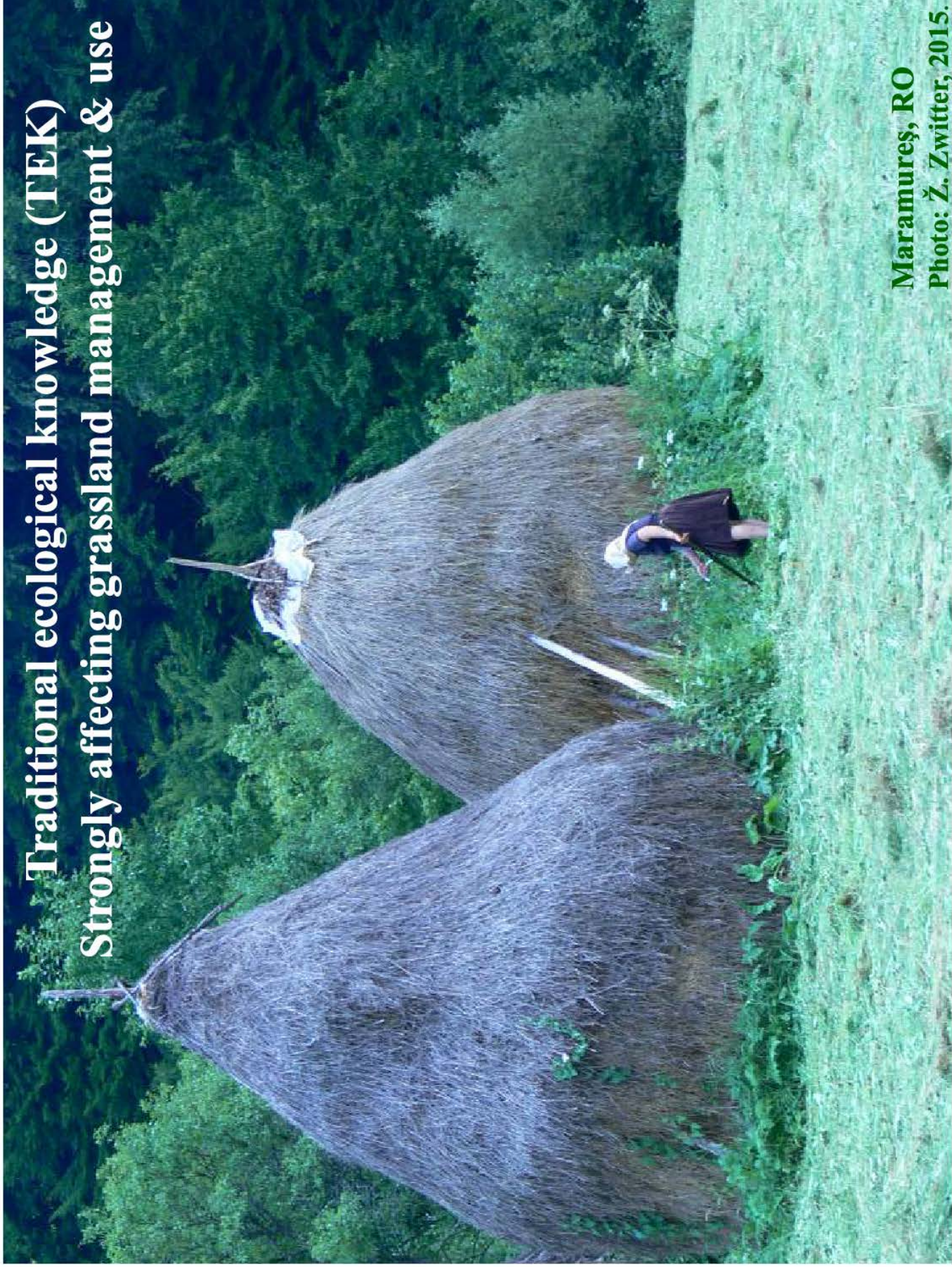


Background: Environmental Atlas of Slovenia. Contents mainly following Bizjak: Urbarji (2006), p. [265].

17th and Early 19th-Century Practices of Grassland Management and Use in the Julian Alps:

- 1. Traditional ecological knowledge**
- 2. Practices of management and use of grasslands in the Julian Alps in the 17th and early 19th century**
- 3. Historical changes in environmental conditions & adaptations to these dynamics**
- 4. Conclusions**

**Traditional ecological knowledge (TEK)
Strongly affecting grassland management & use**



Maramureș, RO
Photo: Ž. Zwitter, 2015.



**traditional ecological knowledge (TEK)
& scientific ecology**

Photo: Ž. Zwitter, 2017.



Traditional ecological knowledge:

1. Provenance of hay matters
1. 2. because the quality of hay differs

Year 1608:

Handwritten text in a cursive script, likely a historical document or letter. The text is written on aged paper and includes the year 1608. A green horizontal line is drawn across the middle of the text.

Photo: Z. Zwitter, 2017.



Traditional ecological knowledge:

1. Provenance of hay matters
1. 2. because the quality of hay differs

Year 1608:

Sehmany androß für die, Jan 6 und wozu mit. 2. 1/2
für man 2/3 für die 1/3 für die 1/3 für die
für die 1/3 für die 1/3 für die 1/3 für die

Year 1606:

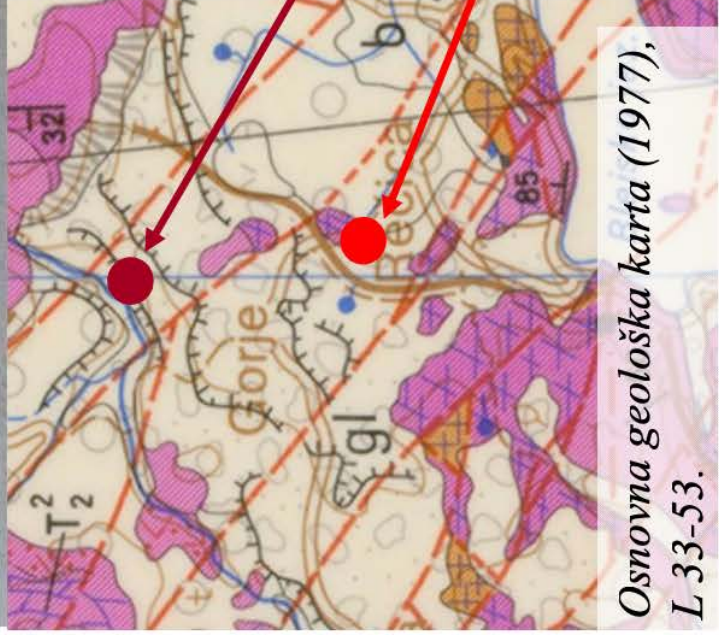
Sehmany androß für die, Jan 6 und wozu mit. 2. 1/2
für man 2/3 für die 1/3 für die 1/3 für die
für die 1/3 für die 1/3 für die 1/3 für die

Traditional ecological knowledge:

2. Hard, low quality plants at a wet site

Year 1607:

*Čy O fobok: foz fureb Gajulli ži fobokij. my fureb fobok
Gajulli ži: Dufanb. avyž fob. fongolajuz gollb. nis
wijo Va fimm fannide fureb ži fof fannit vof fureb
fand gibe fof fureb avyž fobokij fobokij fobokij
fobokij fobokij fobokij fobokij fobokij.*

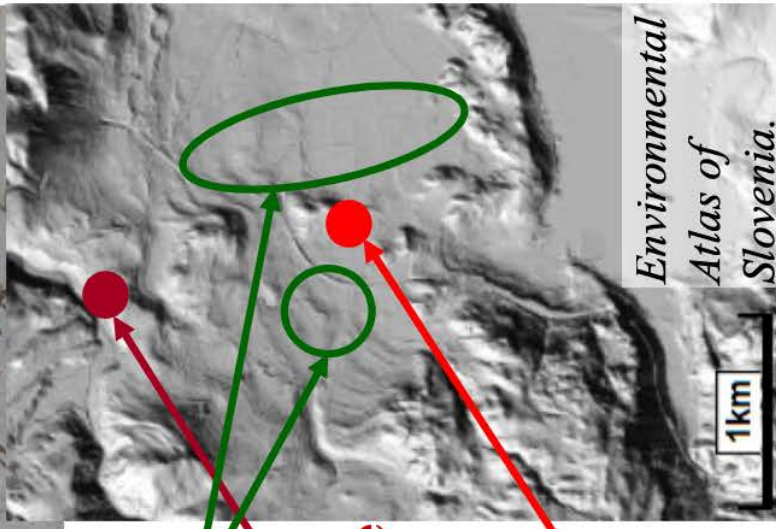


Osnovna geološka karta (1977), L 33-53.

Approximate areas of wet meadows with „sharp grass“ and marshes in 1950s (Melik, *Posavska Slovenija* (1959), p. 40).

Podhom: here the man lived whom this meadow was pawned.

Rečica: here the possessor of this meadow lived.



Environmental Atlas of Slovenia.

Traditional ecological knowledge:

How to cope with the fact that grazing livestock first consumes the best plants in the whole pasture?

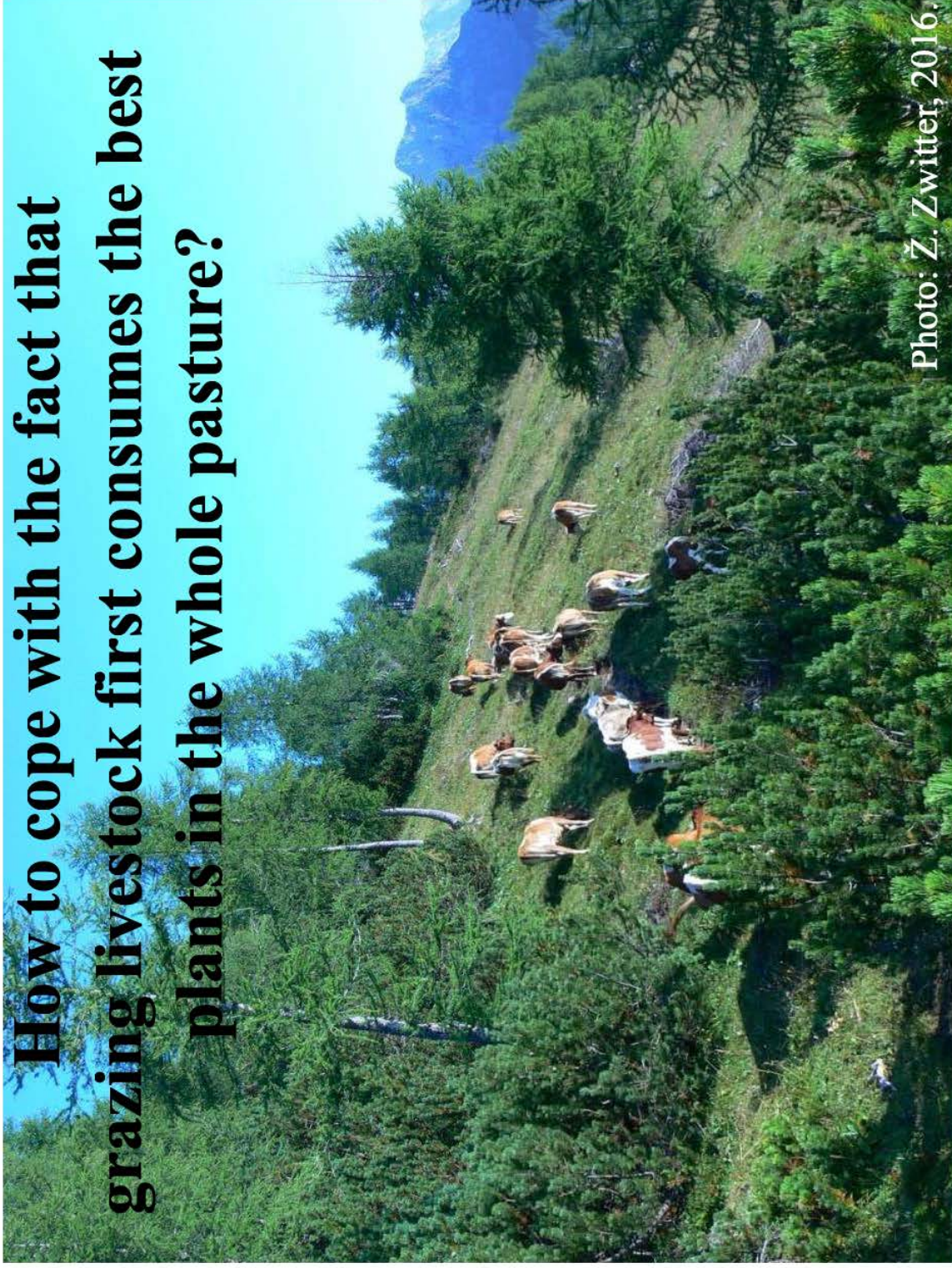


Photo: Z. Zwitter, 2016.

Year 1602:

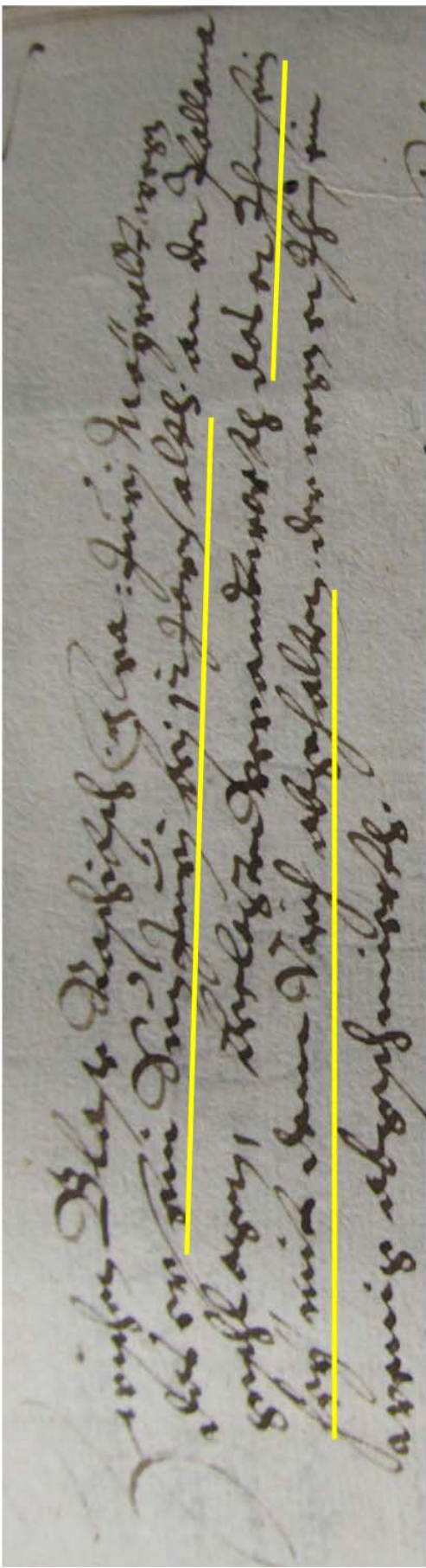
a) Attentive herder

andertheil, von wegen das sie die drey
zu dem Vais, nicht einen Falter die von Alt
soo gezeig, in der gemein die drey
mit einem der Vais zu weiden, das die Falter:

Denn die drey weiden, einen Falter aus
das die drey weiden: das die drey weiden
abfallen will, die die drey weiden
nicht ist ein eigener Falter zu weiden
gefalten, weil sie die drey weiden
die drey weiden Falter, die die drey weiden
die drey weiden Falter, die die drey weiden
die drey weiden Falter, die die drey weiden
die drey weiden Falter, die die drey weiden

b) (In?)attentive herder

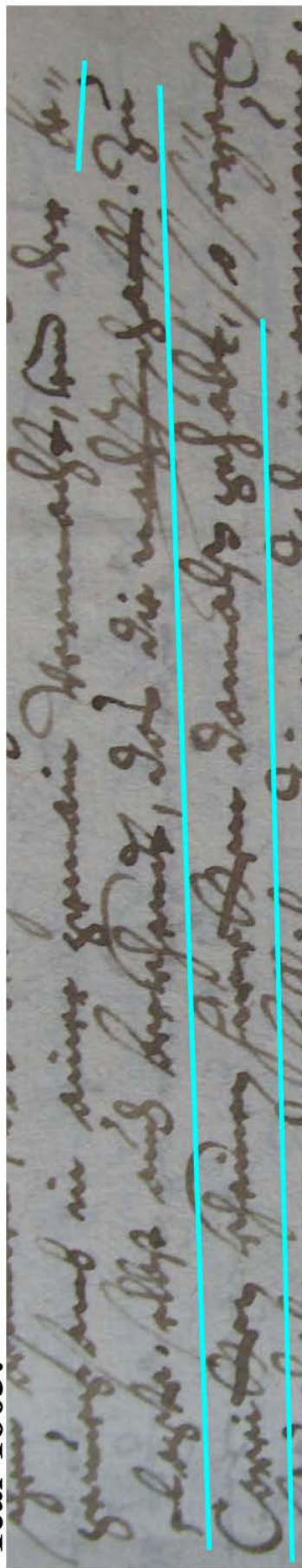
Year 1606:



Einigen Blatz beyfich (In?)
led on tui Dus duri bi i jony als. an dr Lellana
syff agny, itylay zu vorantwylt dcl or zhu
ly' nica. dem Vail abfalyes. In 1606 or 1607 in
Larney abgymibth.

c) Absence of a herder

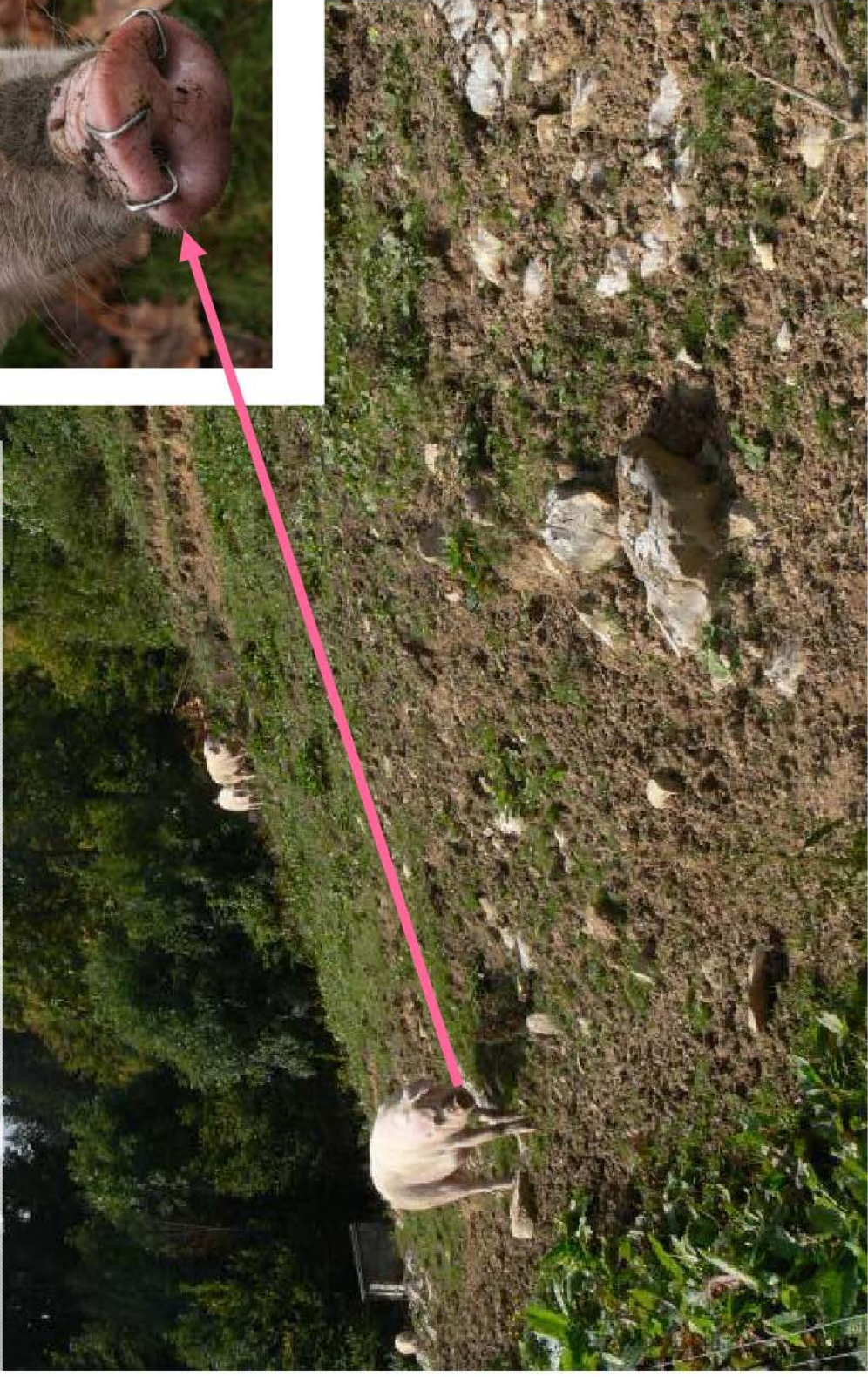
Year 1605:



Einigen Blatz beyfich (In?)
led on tui Dus duri bi i jony als. an dr Lellana
syff agny, itylay zu vorantwylt dcl or zhu
ly' nica. dem Vail abfalyes. In 1605 or 1606 in
Larney abgymibth.

1613: *Handwritten text in a cursive script, likely a historical record or manuscript.*

**Traditional ecological knowledge:
How to prevent pigs from rooting?**



Practices of 17th & early 19th century grassland management:

1. Grazing in alpine meadows in early spring

Year 1608:

Im Jahr 1608, weil man nicht weiß, wie man die Weiden im Frühling
verwalten soll, so ist es zu raten, daß man die Weiden im
Anfang des Jahres mit dem Vieh besetzen laßt, und die
Weiden im Sommer mit dem Vieh besetzen laßt, und

weil man nicht weiß, wie man die Weiden im Frühling
verwalten soll, so ist es zu raten, daß man die Weiden im
Anfang des Jahres mit dem Vieh besetzen laßt, und die
Weiden im Sommer mit dem Vieh besetzen laßt, und

1 May

Koprivnik

until the (hay) harvest

Im Jahr 1608, weil man nicht weiß, wie man die Weiden im
Frühling verwalten soll, so ist es zu raten, daß man die Weiden
im Anfang des Jahres mit dem Vieh besetzen laßt, und die Weiden
im Sommer mit dem Vieh besetzen laßt, und

2nd half of the 20th century: 1-10th May frequently the onset of blossoming of the common dandelion

29th April 2017 – type 1:



Photo: Ž. Zwitter, 2017.

29th April 2017 – type 2:

Photo: Ž. Zwitter, 2017.



29th April 2017 – type 3:

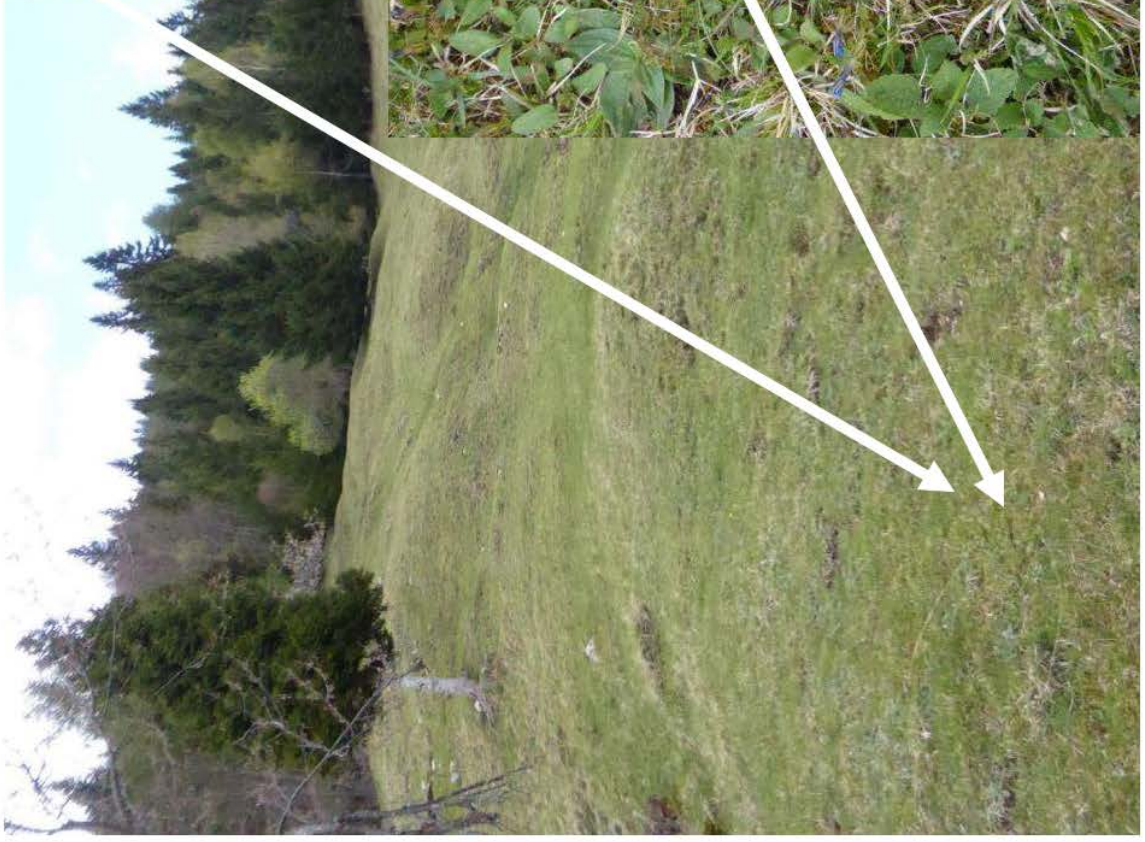


Photo: Z. Zwitter, 2017.

29th April 2017 – types 3 & 1:

THE LONG-TERM PERSPECTIVE?
early 17th century: 1st May.
early 19th century: 25th May; definitely in similar
altitudes, but not clear if the same meadows

Photo: Ž. Zwitter, 2017.

Practices of 17th-century grassland management:

2. Removal of stones from meadows

Year 1610:

*...
bis 1610 9. Entfernung der Steine 9/12 6-6-884/16 n. Di. w. 1610
1610 die 1610 Entfernung der Steine!*

Why?

1. to reduce the infertile area
2. to reduce the time & energy of mowers

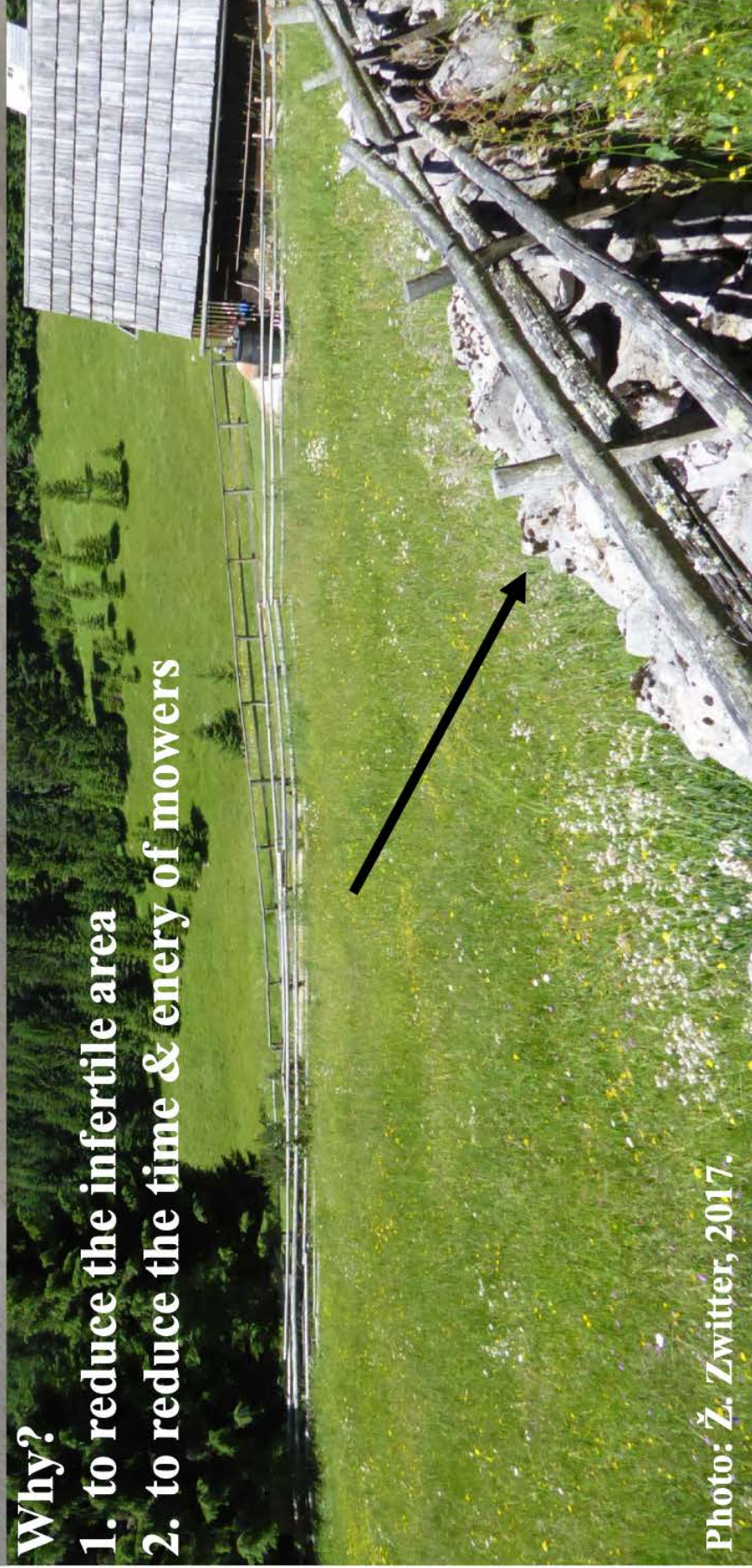


Photo: Ž. Zwitter, 2017.

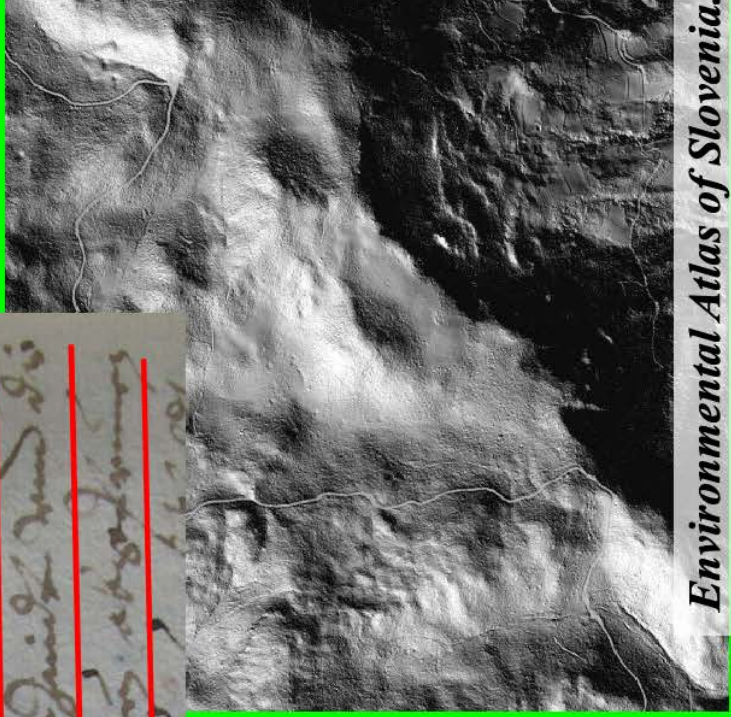
Practices of 17th-century grassland management:

3. Removal of undesired plants

21/5/1605: Tomina Schlegelien amputo fidei; sub-bidmora
und abgabmora fidei in der Groming habetech
in Ky No Zell, und an die the leges von
amherwörnung in Anabidit;
Trilley die Schlegelien so dandig ist in myr ambr
die hilt so furcht die Schlegelien amputo fidei und die
Alte ambramb, die furcht die furcht abgabmora



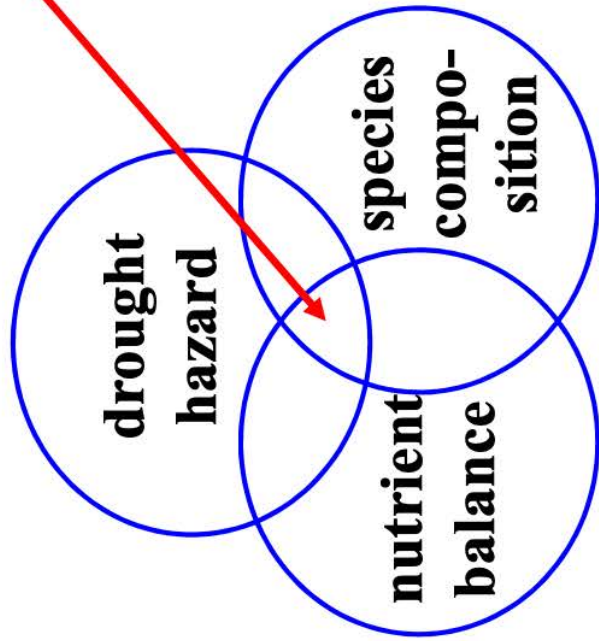
**Platy Triassic
limestone
with chert**



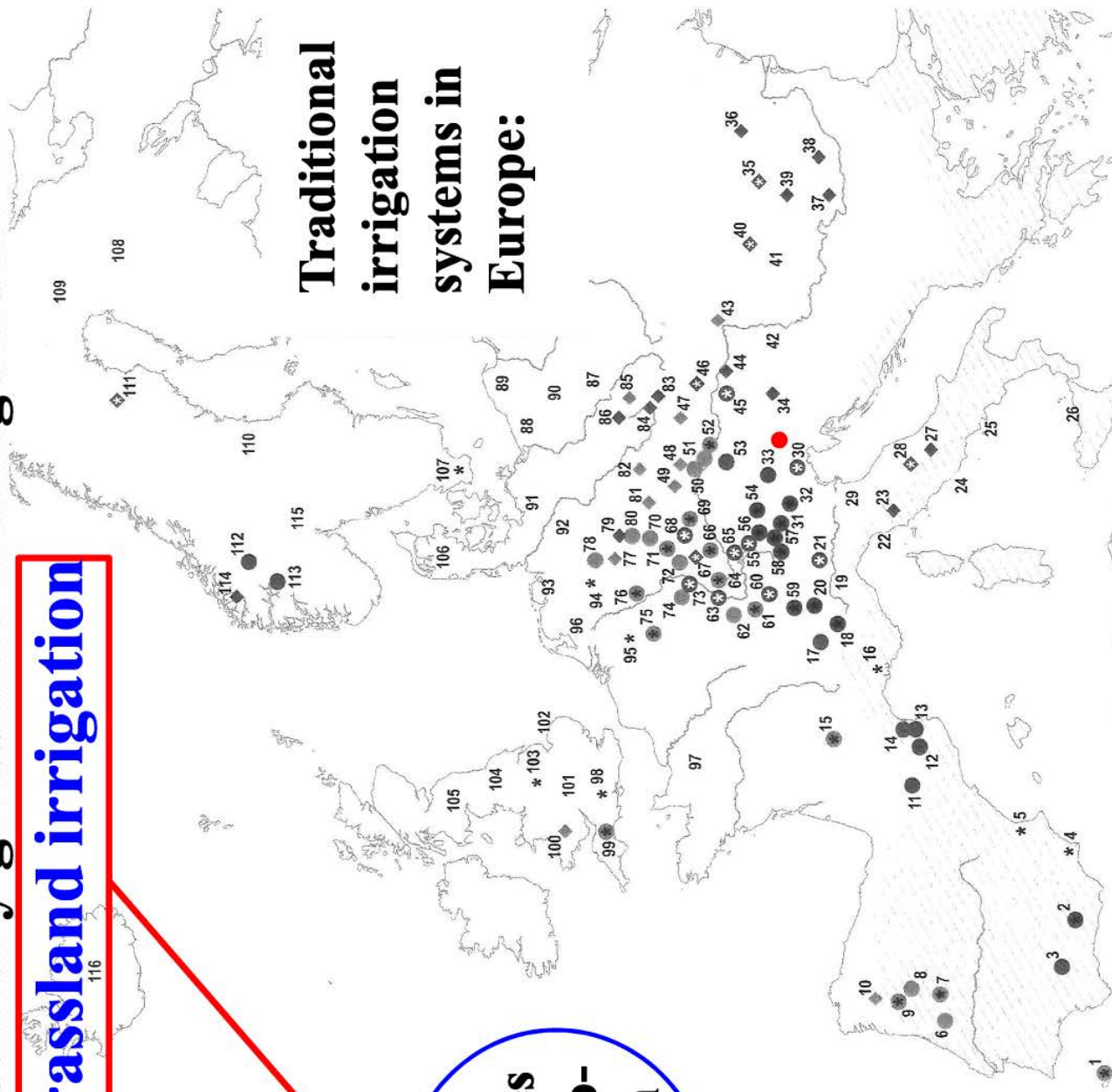
Osnovna geološka karta (1986),
L 33-64.

Practices of 17th-century grassland management:

4. Traditional grassland irrigation



Traditional irrigation systems in Europe:

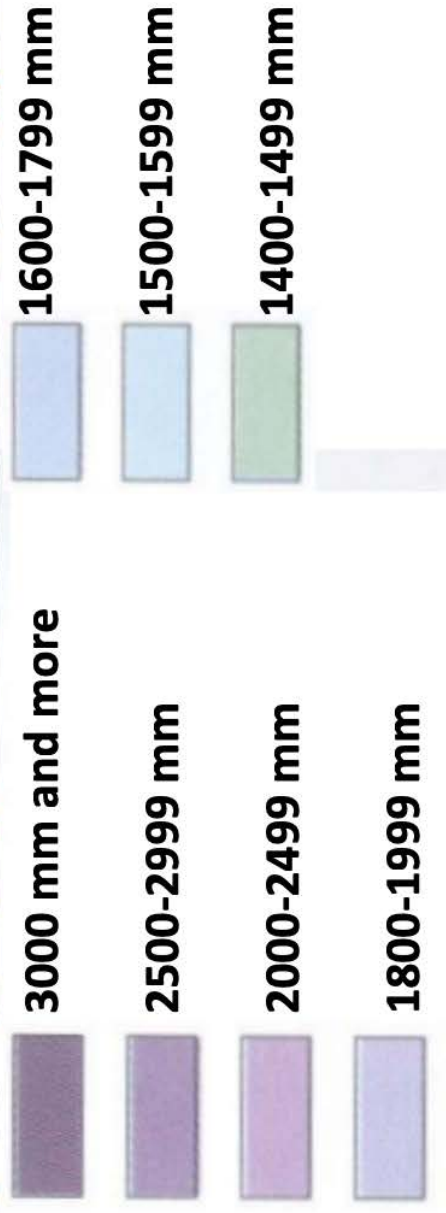
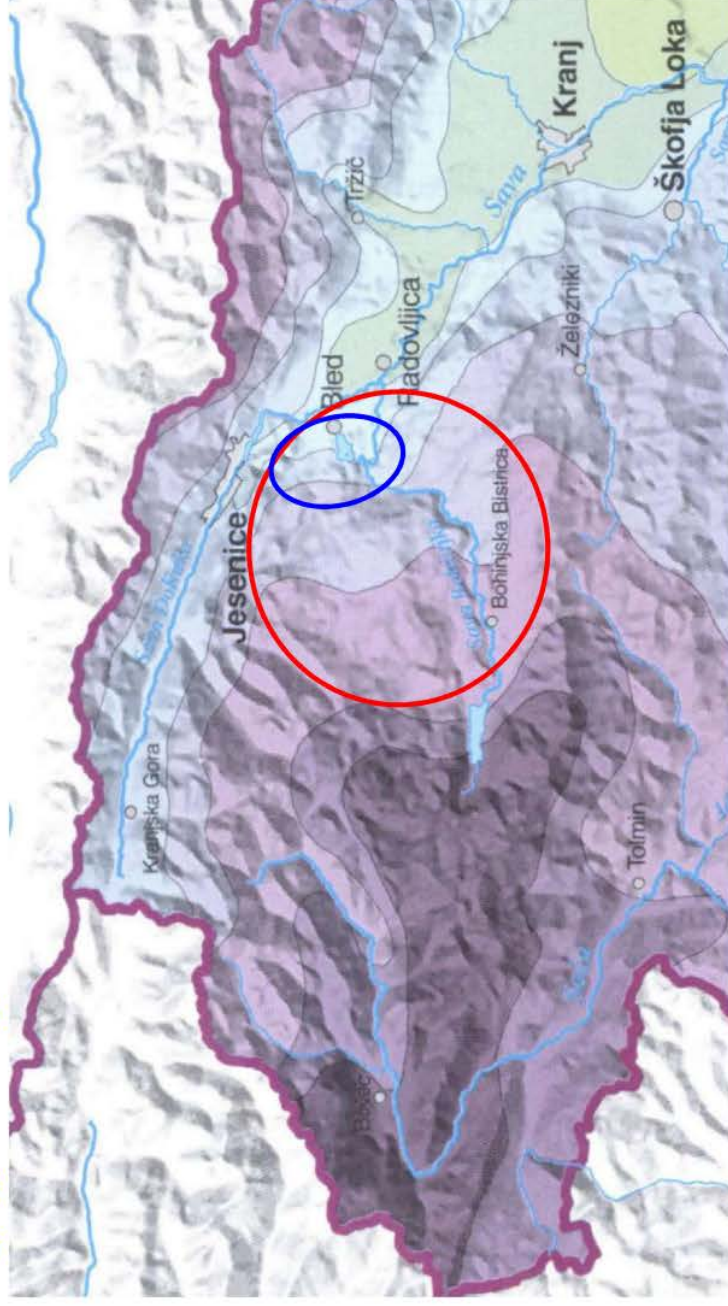


Leibundgut – Kohn,
European Traditional Irrigation (2014), p. 275.

Average yearly precipitation in NW Slovenia (1961-1990)

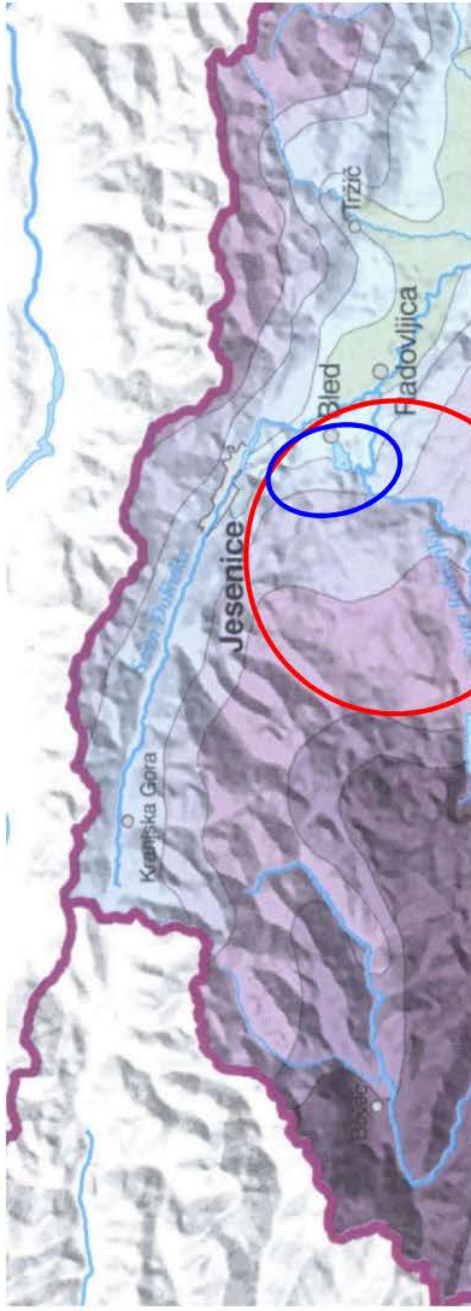
observed
area

○ = main area
of meadow
irrigation in
the 17th and
early 19th
centuries



Geografski atlas Slovenije: država v prostoru in času (1998).

Average yearly precipitation in NW Slovenia (1961-1990)

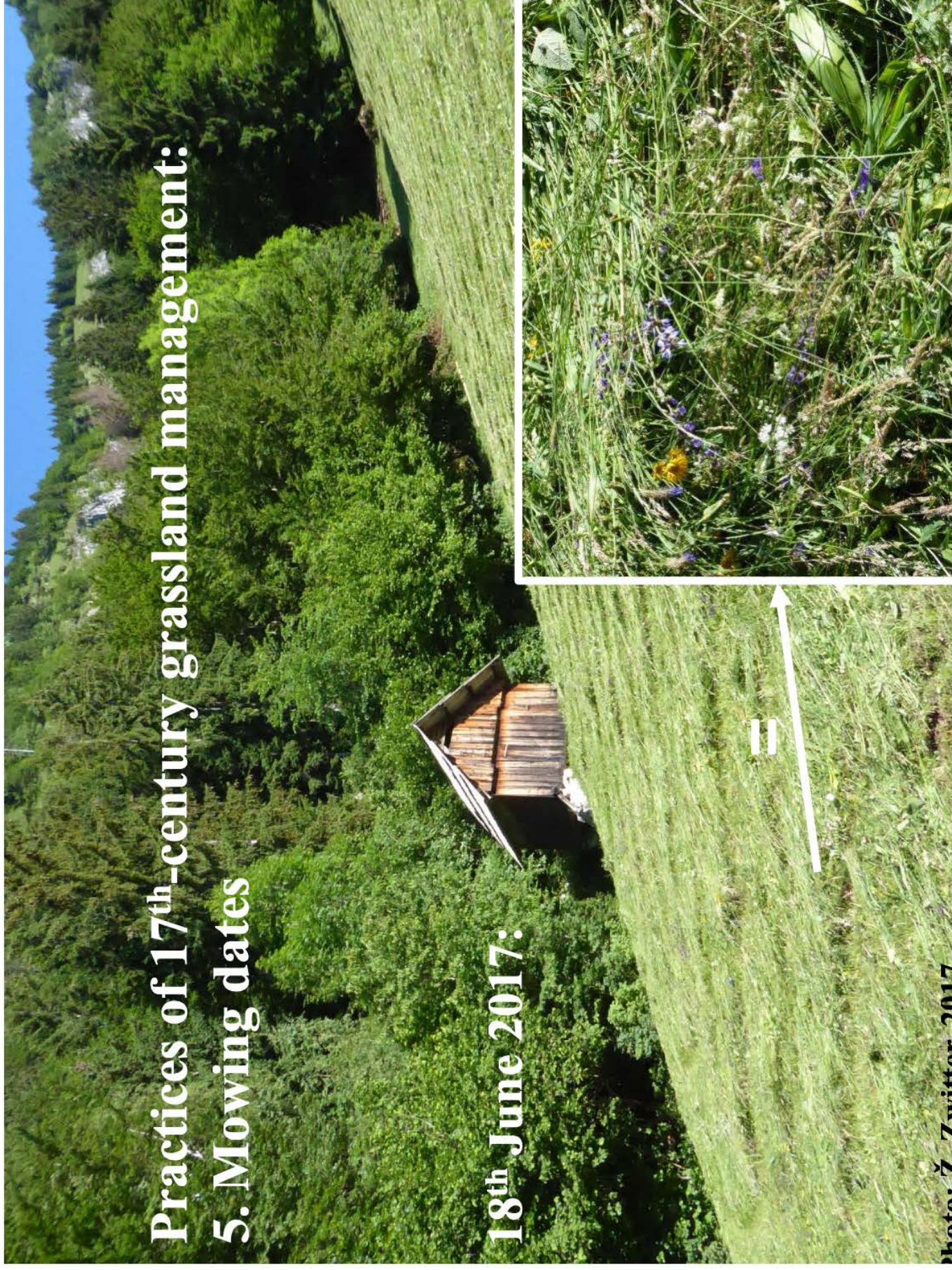


Year 1608:

Zurijfny mifol. bud mathia malby gobob. (f. no. 1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 841. 842. 843. 844. 845. 846. 847. 848. 849. 850. 851. 852. 853. 854. 855. 856. 857. 858. 859. 860. 861. 862. 863. 864. 865. 866. 867. 868. 869. 870. 871. 872. 873. 874. 875. 876. 877. 878. 879. 880. 881. 882. 883. 884. 885. 886. 887. 888. 889. 890. 891. 892. 893. 894. 895. 896. 897. 898. 899. 900. 901. 902. 903. 904. 905. 906. 907. 908. 909. 910. 911. 912. 913. 914. 915. 916. 917. 918. 919. 920. 921. 922. 923. 924. 925. 926. 927. 928. 929. 930. 931. 932. 933. 934. 935. 936. 937. 938. 939. 940. 941. 942. 943. 944. 945. 946. 947. 948. 949. 950. 951. 952. 953. 954. 955. 956. 957. 958. 959. 960. 961. 962. 963. 964. 965. 966. 967. 968. 969. 970. 971. 972. 973. 974. 975. 976. 977. 978. 979. 980. 981. 982. 983. 984. 985. 986. 987. 988. 989. 990. 991. 992. 993. 994. 995. 996. 997. 998. 999. 1000.

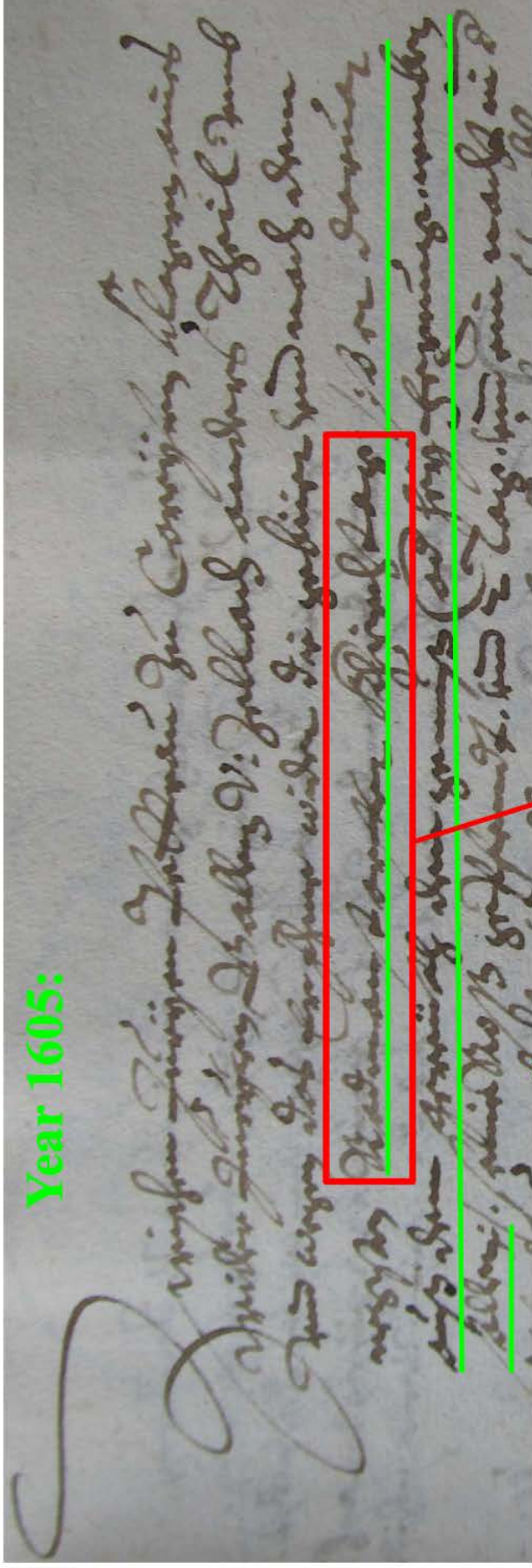
Practices of 17th-century grassland management: 5. Mowing dates

18th June 2017:



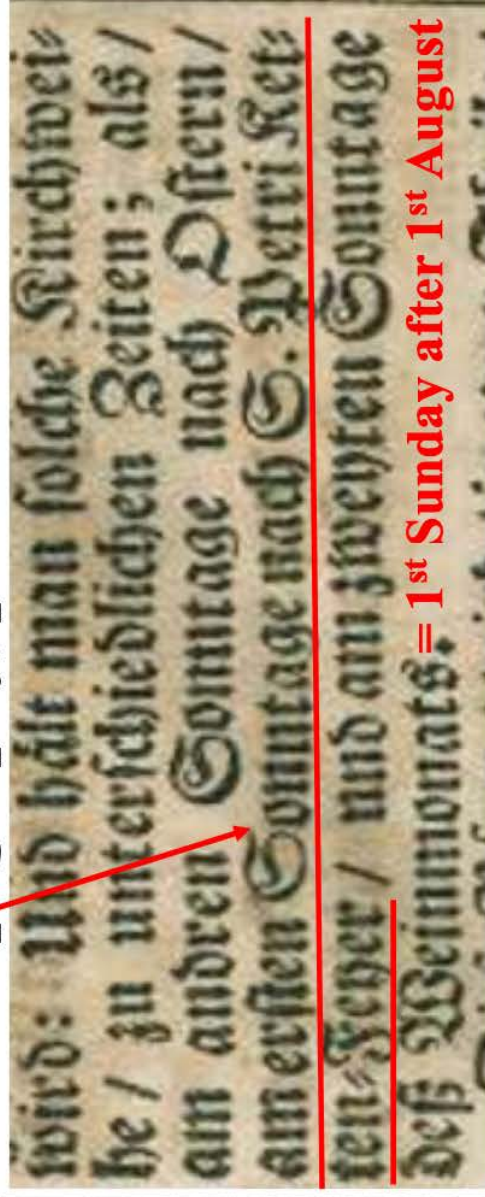
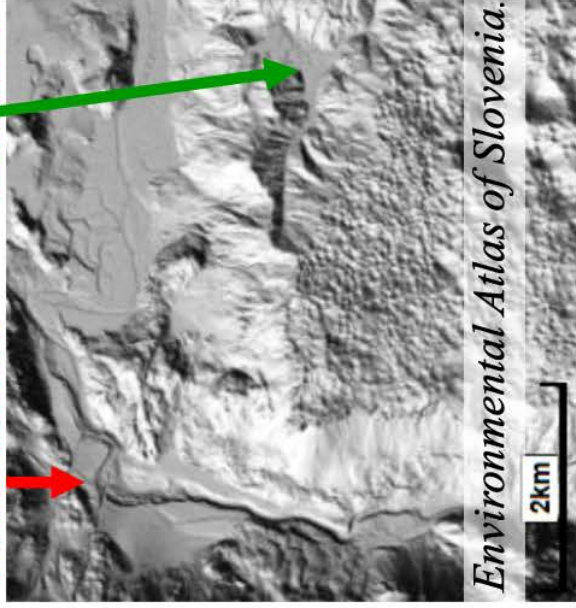
Mowing time in the alpine meadows „TALEŽ“, 700 m a.s.l.

Year 1605:



Wissen Trüben Tällein zu Comigen Layen sind
Milde Trüben, Thallig V. Jollaus anders, Thail und
das wies das gar ohne wider die yohann und nach dem
wysen **Walden am Thallig Thail das**
auf dem Thallig Thail Thallig Thallig Thallig
Thallig Thallig Thallig Thallig Thallig Thallig

VILLAGE TALEŽ Topography, published 1689:



wird: Und hält man solche Kirchweih
he / zu unterschiedlichen Zeiten; als /
am andren Sonntage nach Ostern /
am ersten Sonntage nach S. Petri Ketz
ten-Gebet / und am zweyten Sonntage
des Weinmonats. = 1st Sunday after 1st August

Valvasor, *Die Ehre Des Herzogthums Crain VIII*, p. 794.

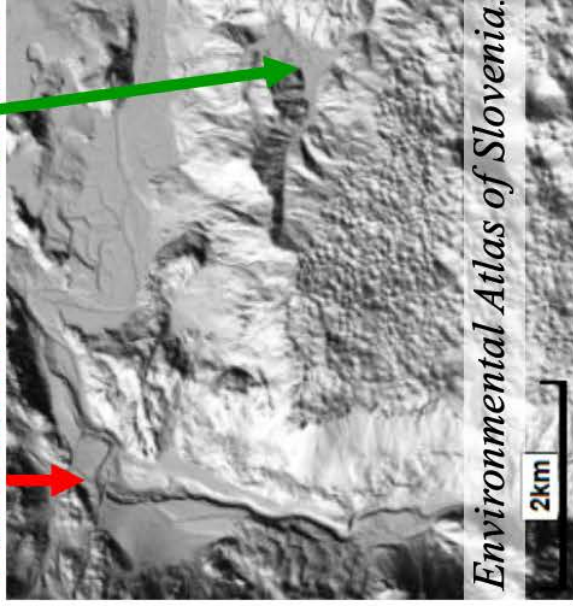
Mowing time in the alpine meadows „TALEŽ“, 700 m a.s.l.

BUT: MOST PROBABLY + SPRING GRAZING UNTIL the movable feast of Ascension (earliest possible date of Ascension: 30th April – latest possible date of Ascension: 3rd June)

Handwritten text in German script, likely a calendar or record. A red box highlights the phrase "Wachman d'wachen".

Year 1605:

VILLAGE TALEŽ



Environmental Atlas of Slovenia.

2km

Topography, published 1689:

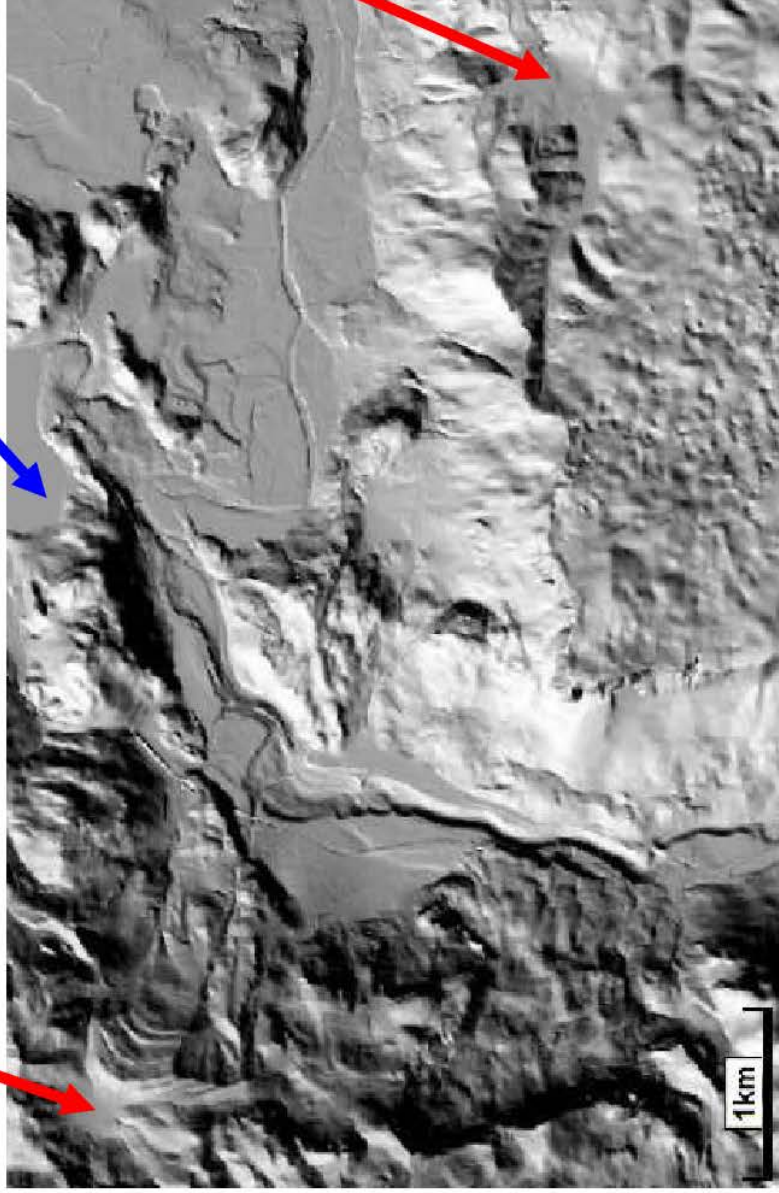
Printed text in German script, likely a topographical or agricultural record. A red line underlines the phrase "am ersten Sonntage nach S. Petri Ketz".

= 1st Sunday after 1st August

Valvasor, Die Ehre Deß Hertzogthums Crain VIII, p. 794.

ca. 900 m a.s.l.:
hay mown before
5th August 1613

**Lake
Bled**



ca. 700 m a.s.l.:
hay had to be stored
before 1st Sunday
after 1st August (data
from 1605)

1. Extremely late mowing dates

1. Extremely late mowing dates

2. Impacts >

1. Nutritive value

1. Extremely late mowing dates

2. Impacts >

1. Nutritive value

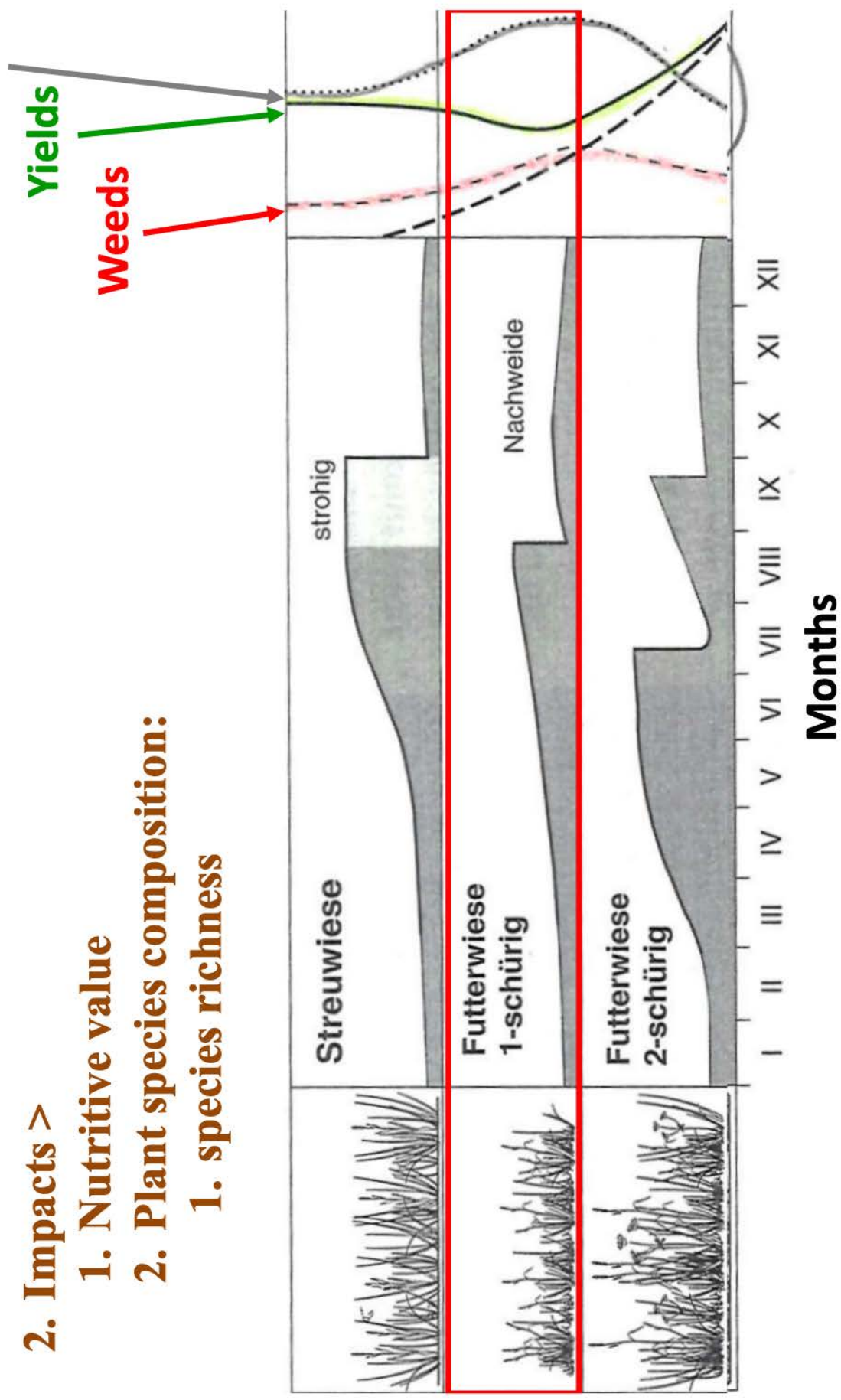
2. Plant species composition:

1. Extremely late mowing dates

2. Impacts >

1. Nutritive value
2. Plant species composition:
 1. species richness

Total number of species



Ellenberg, Vegetation Mitteleuropas mit den Alpen (2010), p. 958.

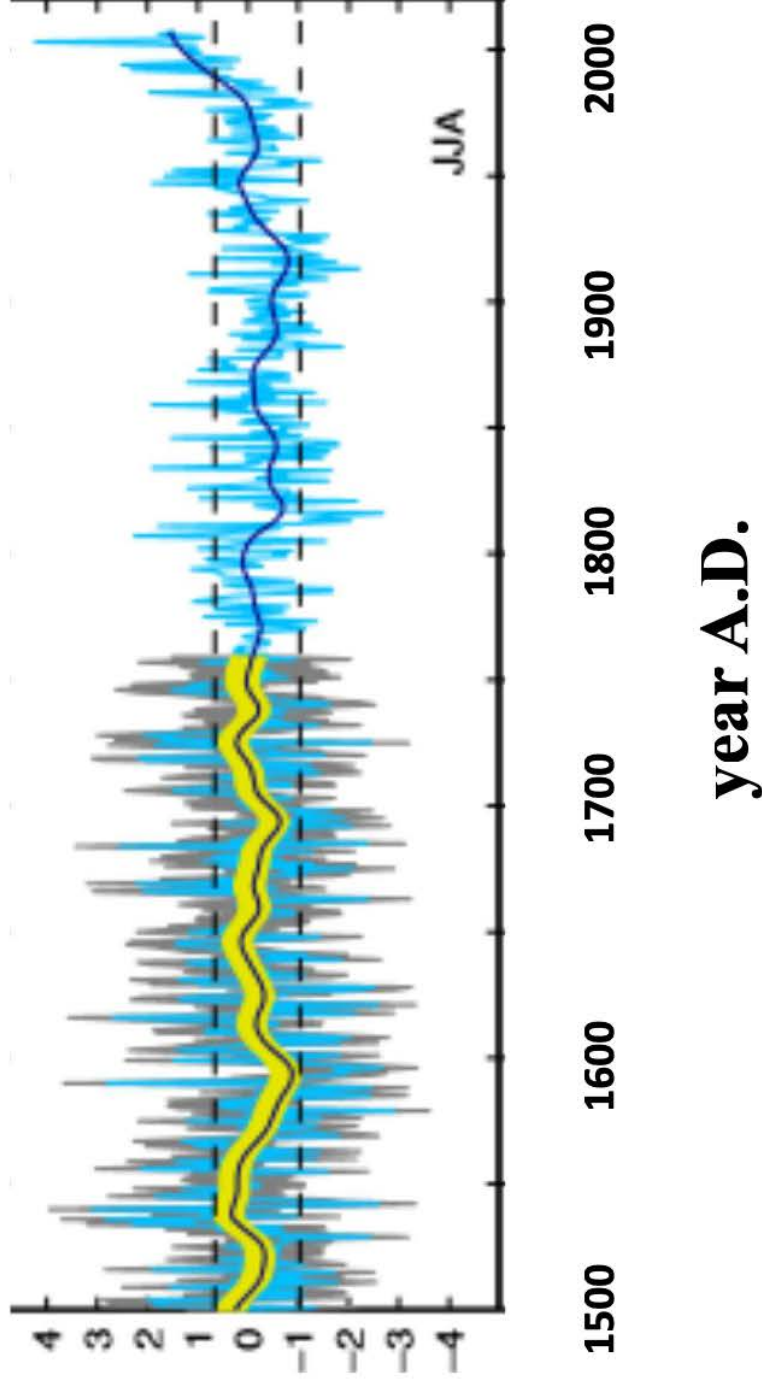
- 1. Extremely late mowing dates**
- 2. Impacts >**
 - 1. Nutritive value**
 - 2. Plant species composition:**
 - 1. species richness**
 - 2. plants not tolerating mowing not suppressed**

- 1. Extremely late mowing dates**
- 2. Impacts >**
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 - 3. shadow in the lower layer of the meadow > higher likelihood that plants which would thrive in abundance of light after mowing suppressed**

- 1. Extremely late mowing dates**
- 2. Impacts >**
 - 1. Nutritive value**
 - 2. Plant species composition:**
 - 1. species richness**
 - 2. plants not tolerating mowing not suppressed**
 - 3. shadow in the lower layer of the meadow > higher likelihood that plants which would thrive in abundance of light after mowing suppressed**
 - 3. Broader importance for habitats: e.g. for birds' nests**

3. Historical changes in environmental conditions & adaptations to these dynamics

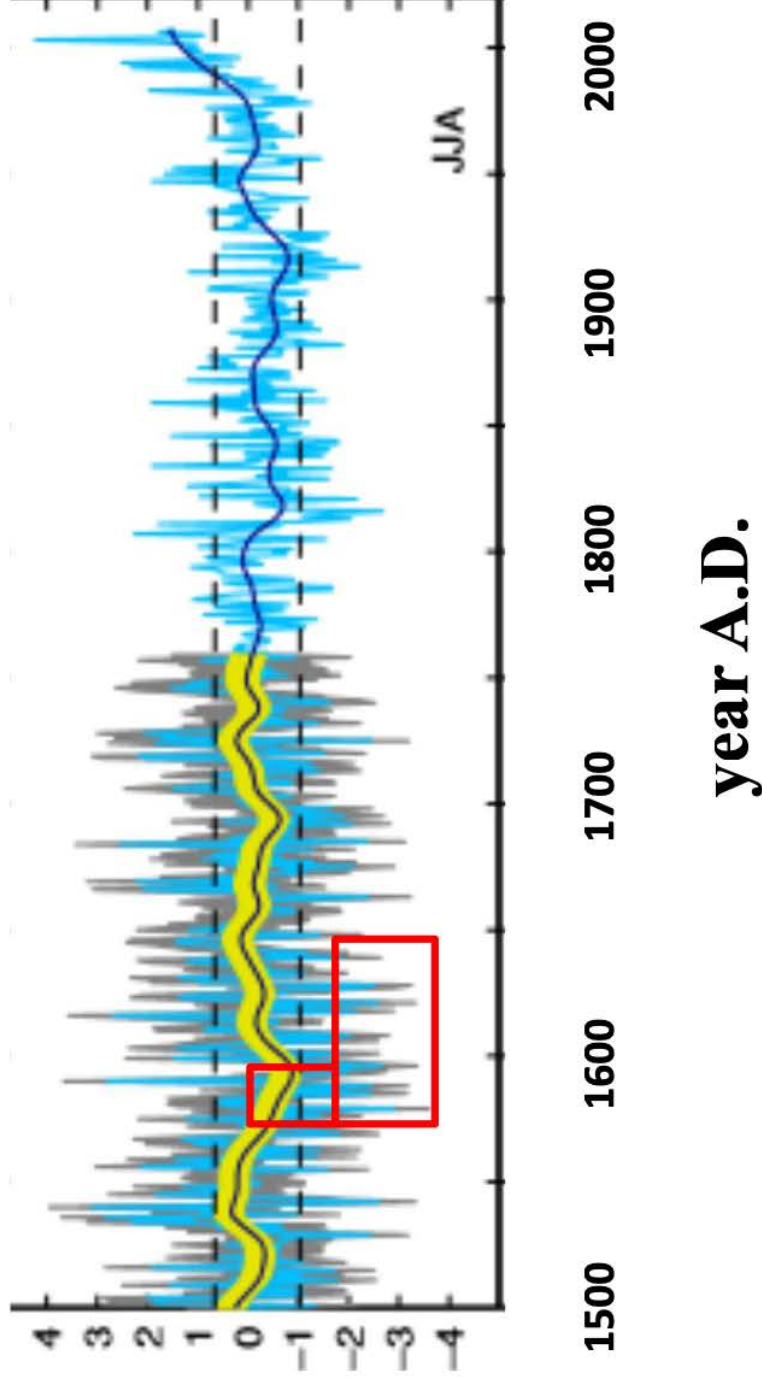
Central European summer temperature reconstruction: anomalies (in °C) from the 1961–1990 average



Dobrovolný et al. (2010), *Monthly, seasonal and annual temperature reconstructions.*

3. Historical changes in environmental conditions & adaptations to these dynamics

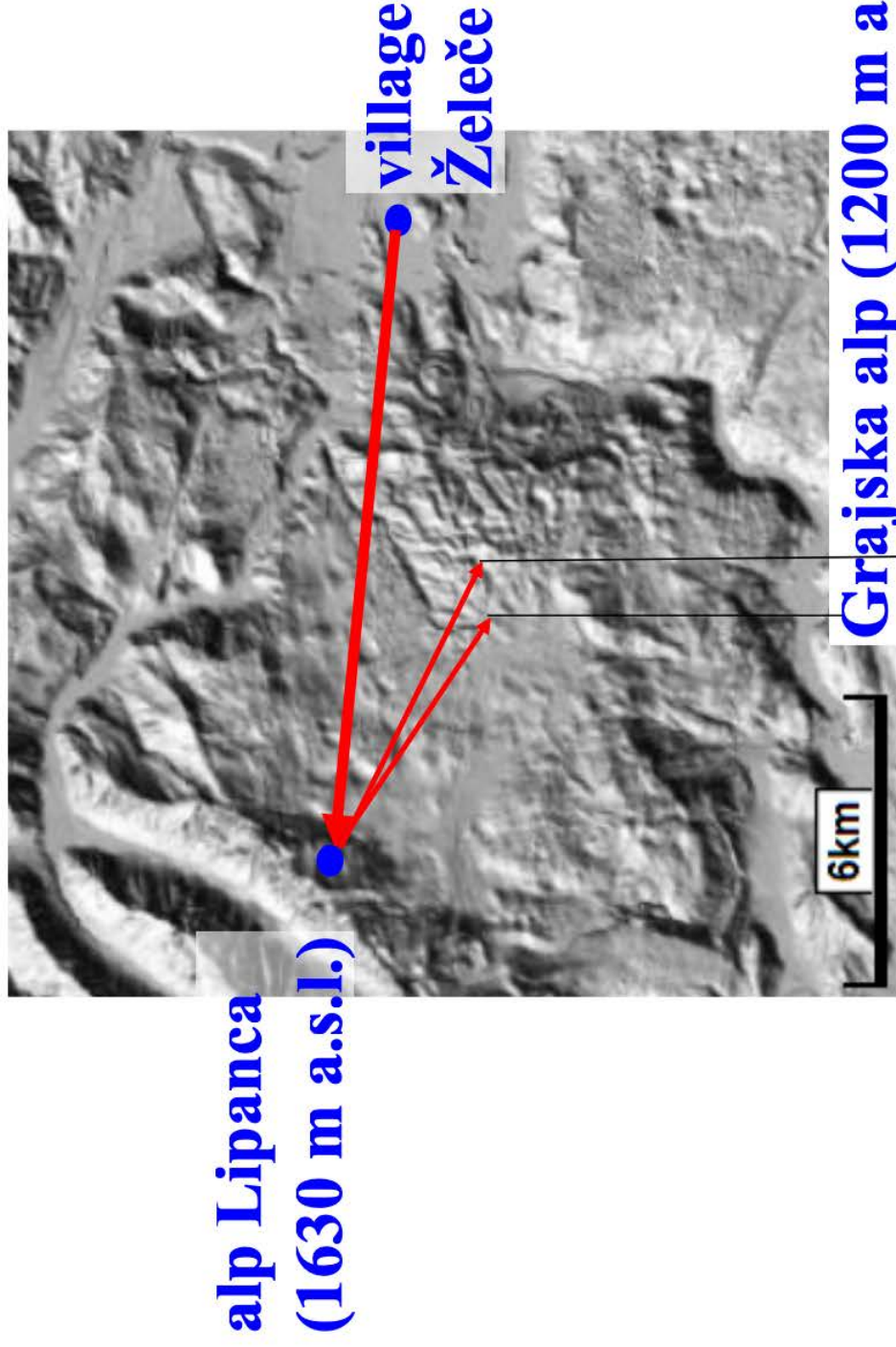
Central European summer temperature reconstruction: anomalies (in °C) from the 1961–1990 average



Dobrovolný et al. (2010), *Monthly, seasonal and annual temperature reconstructions.*

3. Historical changes in environmental conditions & adaptations to these dynamics

1. DATE WHEN HORSES LEFT THE HIGHEST ALP



Environmental Atlas of Slovenia.

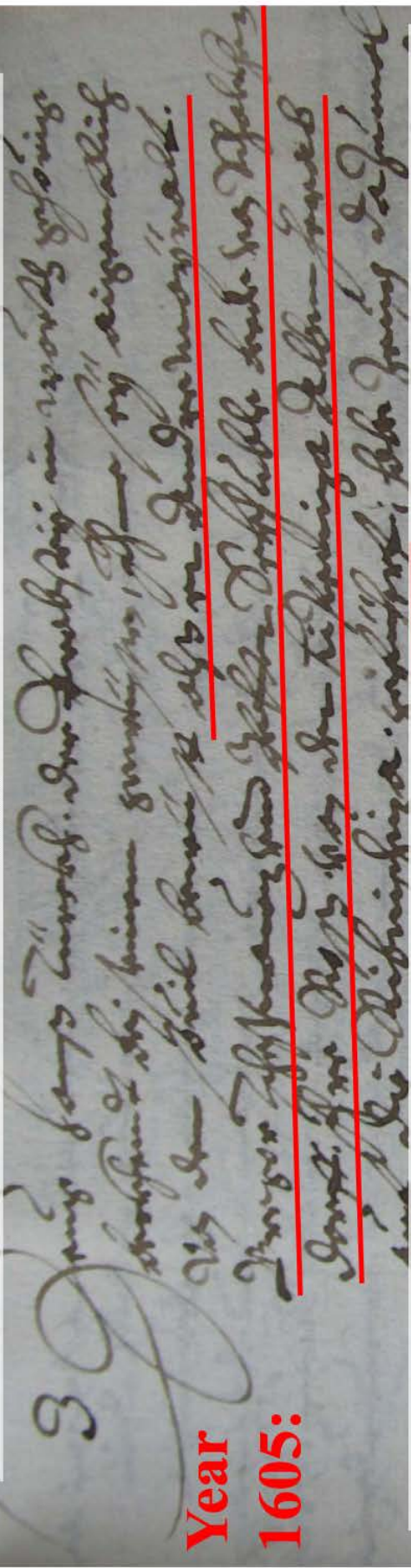
DATE WHEN HORSES LEFT THE HIGHEST ALP

3
Drey fangt zuweilen. Der Fuchsbau in waldigen
gegenden der hiesigen gegend ist
ist der hiesige bau ist als in der hiesigen
Drey fangt zuweilen. Der Fuchsbau in waldigen
gegenden der hiesigen gegend ist
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gegenden der hiesigen gegend ist
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**Year
1605:**

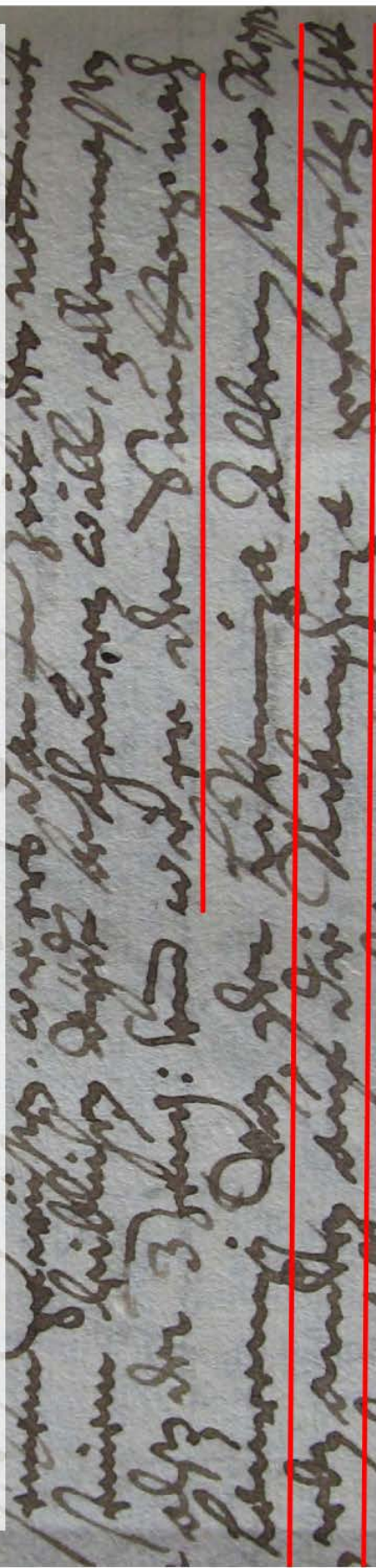
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DATE WHEN HORSES LEFT THE HIGHEST ALP



Year
1605:

Folk tradition in many parts of Slovenia:
10 August is the last summer day/the first autumn day;
after 10 August it rains from every cloud ...
(Kuret, *Praznično leto Slovencev* (1989), pp. 536-537).



3. Historical changes in environmental conditions & adaptations

F. Baš (1931): „Hayrack is a construction aimed primarily at drying cereals and only few hay, not for the adftermath /.../“

Early 19th c.: allegedly even for aftermath



Photo: Ž. Zwitter, 2017.

2. HAYRACK: an adaptation to rainy weather after mowing

17th-century sketsch from the observed territory (Bohinjska Bistrica):



Valvasor, Topografija Kranjske, skicna knjiga (Zwitter, *Okolje na Kranjskem v 17. stoletju po Slavi vojvodine Kranjske*)

Conclusions:

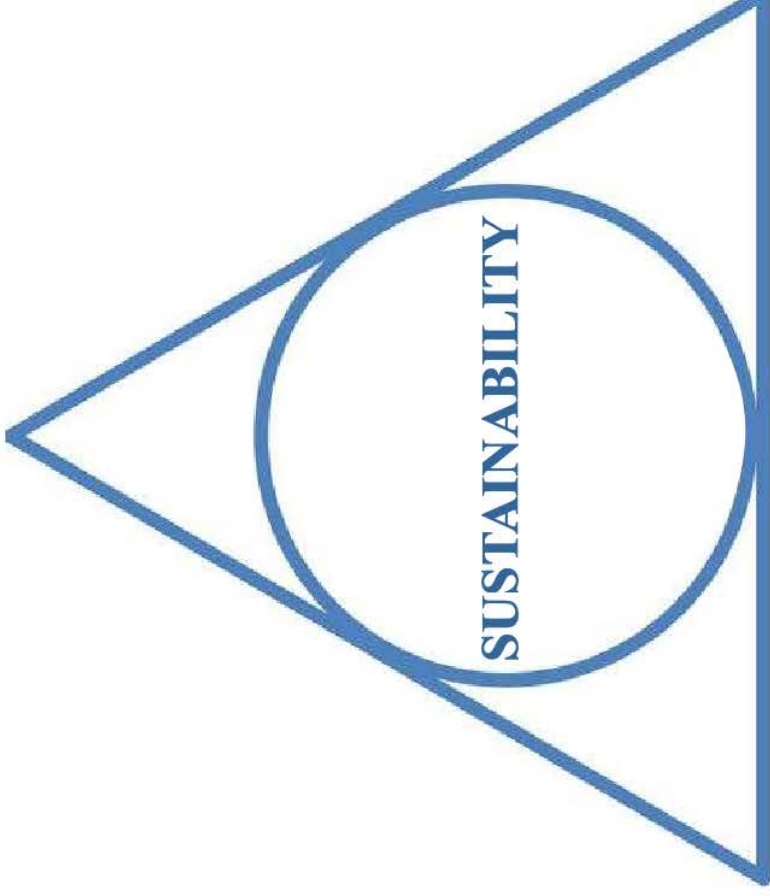
- 1. 17th and early 19th century grassland management practices:**
 - **socio-ecologically recommendable actions**
 - **socio-ecologically problematic decisions**

Conclusions:

- 1. 17th and early 19th century grassland management practices:**
 - **socio-ecologically recommendable actions**
 - **socio-ecologically problematic decisions**
- 2. Long-term perspective: evolution of „traditional“ practices – only some of them constant**

Conclusions: 3. CONTRIBUTION TO SUSTAINABILITY?

ECONOMY



ENVIRONMENT

Scientific basis for reintroduction/preservation of long-term evidence-based best practices of traditional grassland management to environmental change in Alpine grasslands and foster biodiversity



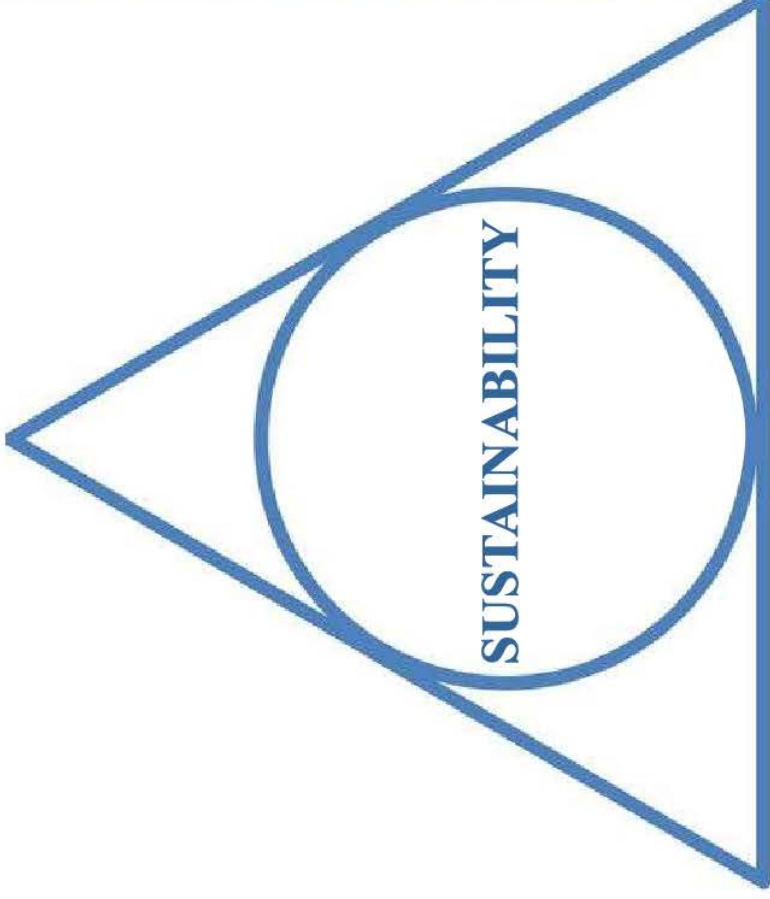
SOCIETY

Source of the scheme:

<http://www.nachhaltigkeitsmanagement.at/joomla/nachhaltigkeit/sustainability/3-sustainability>.

Conclusions: 3. CONTRIBUTION TO SUSTAINABILITY?

ECONOMY



ENVIRONMENT

Scientific basis for reintroduction/preservation of long-term evidence-based best practices of traditional grassland management to environmental change in Alpine grasslands and foster biodiversity

SOCIETY

Relearning/preservation of local knowledge

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Conclusions: 3. CONTRIBUTION TO SUSTAINABILITY?

ECONOMY

- eco-animal husbandry: LT-background for its strengthened resilience to environmental change (e.g. better possibilities for local eco milk & meat products)
- local resources > a decreased vulnerability of farmers to market fluctuations
- tourism: LT-background for restoration/preservation of “traditionally” managed grasslands raising/ preserving the aesthetic value of the landscape



Julian Alps, Slovenia
Photo: Z. Zwitter, 2015.

ENVIRONMENT

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